THE
METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER
ELECTRO-PLATERS REVIEW

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American Electro-Platers' Society Convention

Fourteenth Annual Convention, Held in Newark, N. J. June 28-July 1, 1926

Written for The Metal Industry by E. A. SHAY, Newark, N. J.

The fourteenth annual convention of the American Electro-Platers' Society, which came to an end in Newark, N. J., on July 1, will long be remembered as one of the most successful and progressive conventions of the Society. Over 400 delegates and visitors registered. One of the forward steps taken was a move toward a broader dissemination of the papers read and discussed at the annual conventions.

Aside from this move, the convention will stand out for the high quality of papers read and the size and calibre of the exhibits. More than a score of exhibitors showed their goods, and there were many samples of the work done by the craftsmen belonging to the affiliated branches.

HORACE SMITH
Chairman of the Convention Committee

There also will linger long the remembrance of the pleasure derived from the entertainment provided by the members of Newark branch under the capable direction of Horace H. Smith, and the care taken of the ladies who accompanied the delegates by the women's committee of that branch under the solicitous guidance of Mrs. Horace H. Smith.

NEW OFFICIALS

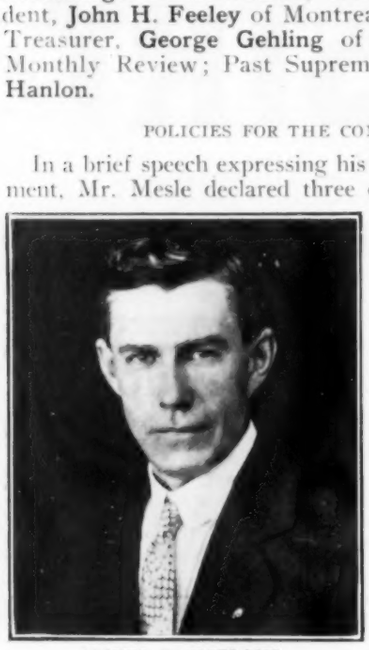
For the coming year the Society will be under the guidance of F. C. Mesle of Sherrill, N. Y., known throughout the country as the editor of the Monthly Review, who was elevated to the Supreme Presidency at the last business session of the convention. Associated with him will be the following officers elected at the same time,

DELEGATES AT THE CONVENTION OF THE AMERICAN ELECTRO-PLATERS' SOCIETY IN NEWARK, N. J.

without opposition: First Vice-President, **Robert Steuernagel** of Milwaukee, Wis.; Second Vice-President, **John H. Feeley** of Montreal, Canada; Secretary-Treasurer, **George Gehling** of Philadelphia; Editor Monthly Review; Past Supreme President, **Frank J. Hanlon.**

POLICIES FOR THE COMING YEAR

In a brief speech expressing his thanks for the advancement, Mr. Mesle declared three of the things which he believed should be stressed most during the coming year were the continuation of the effort to raise money for research work, so that greater progress might be made by the craft as a whole; a continuation of the membership drive, and the enlarging of the Monthly Review.



OLIVER J. SIZELOVE
Winner of Founder's Gold Medal

As a part of the move to enlarge the Monthly Review and to broaden the publicity of the Society by giving trade publications an opportunity to print the papers read at the convention, President **E. J. Musick,** a few minutes before the election, named a committee composed of **George Hogaboom** and **Oliver Sizelove,** both of Newark, N. J., and **Walter Fraine** of Dayton, Ohio, to work with the editor in devising ways and means for greater and quicker publicity.

1927 CONVENTION

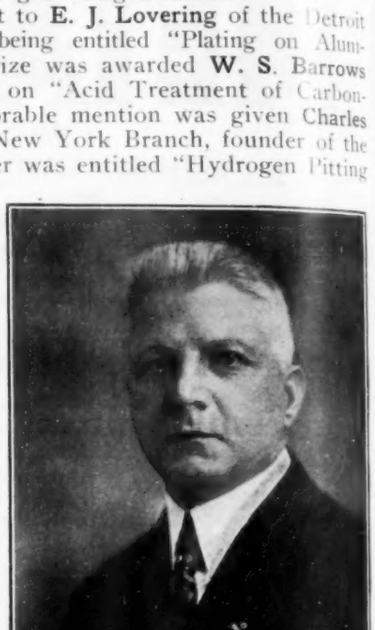
The 1927 convention will be held in Toledo, Ohio.

PRIZES

First prize for the best paper presented at the convention sessions was carried off by **Oliver J. Sizelove,** who also was awarded the Founder's Gold Medal, offered for the best paper or best exhibit as the case might be. The title of his paper was "Approved Methods of Analyzing Plating Solutions."

Second prize went to **E. J. Lovering** of the Detroit Branch, his paper being entitled "Plating on Aluminum" and third prize was awarded **W. S.** Barrows of Toronto Branch on "Acid Treatment of Carbonized Steels." Honorable mention was given **Charles H. Proctor** of the New York Branch, founder of the Society, whose paper was entitled "Hydrogen Pitting in Nickel Plated Deposits," and **A. Pearson** of Chicago Branch on "Zinc Cyanide vs. Zinc Sulphate Plating Solution."

For the best exhibit the first prize was awarded to George E. Bell of Bridgeport Branch, second prize going to Milwaukee Branch and third prize to George Lankemeyer of the St. Louis Branch.



CHARLES H. PROCTOR
Founder, American Electro-Platers' Society.

W. E. HUGHES AN HONORARY MEMBER

By a unanimous vote, the nearly 300 delegates elected W. E. Hughes, B.A., D.I.C., an honorary member of the Society. Mr. Hughes is the author of "Modern Electro-plating" and sent a carefully prepared paper on "Faraday's Laws" read at the convention.

CONVENTION PROCEEDINGS

The convention was opened Monday morning, June 28, by Mr. Smith, who welcomed the delegates as guests of the Newark Branch. George Onkson, president of the

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Newark Branch also made a short address of welcome. The welcome of official Newark was given by P. H. W. Ross, trade consultant of the city and the welcome from the industrial and commercial concerns was given by Edmund W. Wollmuth, executive secretary of the Newark Chamber of Commerce. Response was made by Past Supreme President Hanlon who was followed by Mr. Proctor. The session was then turned over to Supreme President E. J. Musick, and the balance of the afternoon was devoted to reports of officers, and routine business.

Mr. Hanlon reported that $3,050 of the $10,000 sought for a research fund had been raised, the money being in the bank. Promise had been made of about $2,500 from a certain organization, but was yet to be received. High praise was given Dr. William Blum, chemist of the United States Bureau of Standards, who has greatly aided the work of research of the craft. A vote of thanks was given to the Research Committee for its good work.

The evening session of June 28, the three sessions of June 29 and the evening session of June 30 were devoted to the reading and discussion of technical papers. The afternoon session of June 29 was broken into for a visit to the plant of Hanson & Van Winkle Company in Newark. Prior to the opening of the convention several score of the delegates visited the Harrison plant of the General Electric Company in Harrison and saw how electric light bulbs were made.

On the morning of June 30, the delegates went by de luxe buses to Raritan where an inspection was made of the Raritan Copper Works. After this visit they were guests of A. P. Munning & Company of Matawan at a shore dinner at Smoke Shop Tavern at Red Bank, along the shores of Shrewsbury River. The affair was strictly informal, A. P. Munning, head of the company, making a few remarks of welcome. After spending two hours at the dining table, the party went to the Munning plant at Matawan for a visit of inspection. The party reached Newark on the return trip just as the evening session opened at 8 o'clock.

On the morning of July 1 short inspection visits were made to the plant of the Waterman Fountain Pen Company and the plant of the A. Newman Hardware Company in Newark.

LADIES' PROGRAM

While the men were at work, the ladies accompanying the delegates were enjoying the city and the surrounding country. Almost before the convention was open, they were away on a shopping trip to the L. Bamberger & Company department store. That evening they were the guests of the reception committee at a card party at the Home of Newark Lodge of Elks. On June 29, the morning was spent in an automobile trip to the Harrison plant of the General Electric Company where they saw the same things their relatives had seen the preceding day. During the afternoon they were taken on an automobile ride through the Essex County Park system, stopping at Short Hills as the guests of Mrs. Van Winkle Todd for tea. That evening they visited one of the city pleasure parks.

While the men were enjoying the Shore dinner on June 30, the ladies were taken by auto bus to Asbury Park where they spent the day on one of the state's sea-shore playgrounds, enjoying bathing and other amusements. On the morning of July 1 there was another shopping trip and during the afternoon they attended the baseball game and other athletic events at Weequahic Park. In the evening they were guests at the annual banquet of the Society, enjoying the entertainment and dancing.

EXHIBITORS

The exhibitors included A. P. Munning & Company, Matawan, N. J.; Zapon Company, New York; Anaconda Copper Mining Company, New York; Magnus Chemical Company, Brooklyn; Daniels & Orben, Inc., New York; Oakley Chemical Company, New York; Crown Rheostat & Supply Company, Chicago; The Reynolds & Robson Supply Company, Philadelphia; Charles Hardy, Inc., New York; Miner-Edgar Company, New York; The Hanson & Van Winkle Company, Newark; THE METAL INDUSTRY, New York; Brass World Publishing Company, New York; Fuhrman & Lundberg, Chicago; State Manufacturing Company, Chicago; Egyptian Lacquer Company, New York; MacDermid, Inc., Waterbury, Conn.; Connecticut Dynamo & Motor Company, Irvington, N. J.; Pittsburgh Plate Glass Company, paint and varnish division; Matchless Metal Polish Company, Glen Ridge, N. J., and Chicago; J. B. Ford Company, Wyandotte, Mich.; Apothecaries Hall Company, Waterbury, Conn.; Maas & Waldstein Company, Newark and New York; L. J. Mueller Furnace Company, Milwaukee, Wis.; Payson Manufacturing Company, Chicago, of which R. A. Kelley

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is superintendent of plating; Arco Manufacturing Company, Inc., New York.

MEMBERS' EXHIBITS

Work done by individual members of the Society on view included that done by Harry M. Roberts of the U. S. A. Lite Company; Tennant Elwin of the Connecticut Telephone & Electric Company; H. R. MacFadyen of the Arrow Electric Company, William J. R. Kennedy; J. A. Bagshaw of the Bealon & Cadwell Manufacturing Company; Charles H. Bohler of the Elite Novelty Company; George Vibbert all of whom are members of the Hartford-Connecticut Valley Branch; Samuel Taylor of the Gorham Company, Newark.

There were also on exhibition samples of plating done by Bassett Metal Goods Company; Excelsior Hardware Company; Remy Electric Company; Duplex Safety Pin Company; Kraueter Manufacturing Company; L. A. Meyers, Jr., Inc.; W. D. Allen Manufacturing Company; August Goertz & Company, Inc.

Goods plated by the Majestic Manufacturing Company of St. Louis back in 1917, 1918 and subsequent years, which were processed without being touched by hand, were on exhibition to prove that nickel did not tarnish as quickly as generally believed. The pieces, which had been stored in the plating room since they were previously exhibited in the year they were plated, were taken from the packages and placed on the tables without refinishing. None showed tarnish or deterioration of any kind.

PICNIC AND BASEBALL GAME

During the afternoon of the last day of the convention the delegates held a series of athletic events and the annual baseball game between teams composing the East and the West at Weequahic Park. C. Frey of Newark umpired. The team representing the West won the baseball game. The official photograph of the delegates and their guests was taken at the Park.

BANQUET AND ENTERTAINMENT

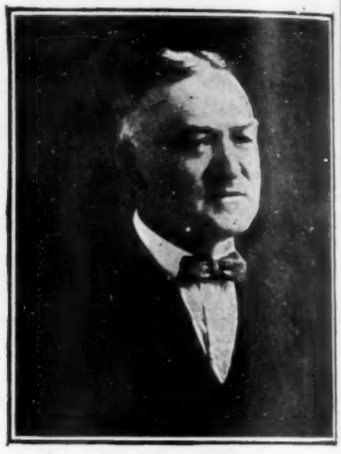
The new officers were installed following a banquet in the Mosque banquet hall attended by approximately 1,000 persons. As the banquet was about to begin the members of New York Branch, headed by a band, marched into the hall and circled the balconies surrounding the main floor, waving flags and handkerchiefs. The onslaught of the New Yorkers came as a surprise to the rest of the delegates who were unprepared for the move.

The banquet and installation was followed by an entertainment and dance. Souvenirs were distributed by the Hanson & Van Winkle Company, Roessler & Hasslacher Chemical Company and the Newark Branch. The entertainment provided was the finest and most elaborate ever staged at any convention of the Society.

New Officers of the American Electro-Platers' Society

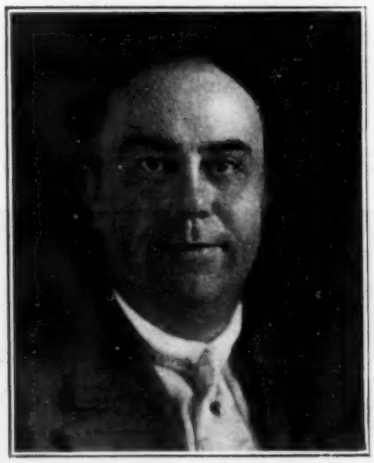
F. C. MESLE,
President.

ROBERT STEUERNAGEL,
1st Vice Presdient.



JOHN H. FEELEY,
2nd Vice President.

GEORGE GEHLING,
Secretary-Treasurer.



F. J. HANLON,
Editor, The Monthly Review.

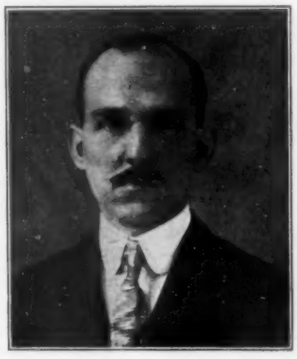
E. J. MUSICK,
Past President.

International Fellowship Club

The International Fellowship Club, composed of men selling to the plating trade held its dinner at the Elks Club on Sunday night, June 27, about forty being in attendance. Ernest Lamoreaux of Chicago was elected president for the coming year; George B. Hogaboom of Newark was elected vice president and R. J. Hazucha of Chicago, secretary. The next meeting will be held preceding the banquet of the Chicago group, which will take place early in January. It is likely that this will be made a luncheon meeting.

New Officers

ERNEST LAMOREAUX
President



GEORGE B. HOGABOOM
Vice-President

R. J. HAZUCHA
Secretary-Treasurer

The Graduate

By E. G. LOVERING, Detroit Branch

When I quit my days at college,
With my little store of knowledge,
I was sure beyond a question,
That the world would soon be mine.

I was fully educated,
In Chemistry I graduated,
So I knew that very shortly,
As a bright light I would shine.

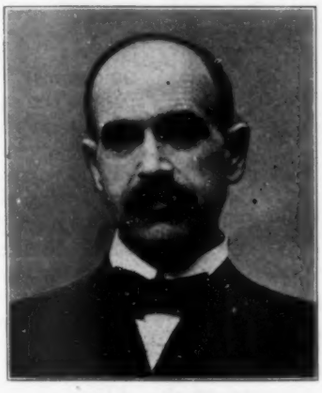
I was filled with high ambition,
Not for me the small position.
As a plater's helper
I would never start.

For at once I knew I'd show, Sir,
I knew all there was to know, Sir,
And the Platers all would marvel
That a man could be so smart.

I'd show 'em how to chrome plate,
How to make it nice and bright,
And to nickel auto parts, Sir,
That would stand up over night.

They would never have to hurry
Or pH control to worry,

E. G. LOVERING
Winner of Second Prize



W. S. BARROWS
Winner of Third Prize

And their plating would be heavy,
Good and strong.

There'd be no such thing as pitting,
Spotting out would soon be quitting,
And to strip a piece of work
Would soon be wrong.

With the dreams of youth I started,
Optimistic, valiant hearted,
But I rudely was awakened,
On the battlefield of life.

All the dreams that I had cherished,
Bruised and battered, quickly perished,
For alas, the pits were pitting
As I struggled through the strife.

A Diploma, boy, is splendid,
And it needn't be defended,
And a chance to go to College
Is a thing you shouldn't spurn.

It is fine in lab and study
But I'm here to tell you, Buddy,
That there's more than college to it,
You have to live to learn.

Note on the Protection of Iron by Cadmium

A Paper Presented at the Forty-ninth General Meeting of the American Electro-chemical Society Held in Chicago, Ill., April 22, 23 and 24, 1926 [1]

By HENRY S. RAWDON
Physicist, Bureau of Standards

The statement by Evans[2] that "If no direct experimental work on 'corrosion' had even been carried out, and if our only experimental data was a knowledge of the 'normal electrode potentials' of the various metals, it would be possible also to predict roughly the conditions under which 'electrochemical corrosion' would be expected to occur; it would be possible also to predict qualitatively the character of the corrosion phenomenon," is especially applicable to metals covered with metallic coatings.

It is universally recognized that, in order for a metal coating to afford other than simple mechanical protection to the covered metal, it is necessary that the coating metal have a higher "solution pressure" than the metal which is coated; in other words, that when both coating and base metal are wet with an electrolyte, the coating shall function as the anode of the couple. It cannot be assumed, however, that if this requirement is met, the coated metal will always be protected electrochemically from corrosive attack. In some cases, as aluminum coating on iron, for example, conditions may arise which neutralize in large measure, the "protective action" which one would expect from the relative electrode potentials of the metals, aluminum and iron. If the coating metal becomes inactive or passive, for example, by the formation of protective film as a result of initial corrosive attack, as is probably the case with aluminum, the electrochemical protection of the base metal is seriously reduced. In general, however, satisfactory explanations can readily be advanced for cases of this kind.

In the case of cadmium coatings on iron and steel, a rather peculiar condition obtains. General experience with cadmium-coated sheet steel and iron, the coating being applied either by electroplating or by the metal spraying process, indicates that in such material cadmium behaves similarly to the zinc in zinc-coated iron and steel, that is, it protects the iron from corrosion. However, most modern writers have assigned values to the electrode potential of cadmium, and iron, which would indicate that cadmium should not exert such an influence.

RELATIVE ELECTRODE POTENTIALS: ZINC, CADMIUM, IRON.

In each of six rather recent American books relating to the subject of electrochemistry[3] values are given for the electrode potential of cadmium, zinc and iron, which place cadmium on the opposite side of iron to zinc. Of the authors mentioned, only Lewis and Randall base their values on experimental work.

There is fair agreement among different writers as to the values of the normal electrode potentials or zinc and cadmium, but not so for iron.

EXPERIMENTS.

Because of the uncertainty as to the real order in which the three metals should stand in the electrode potential series, and the erroneous conclusions which may readily be drawn especially with respect to the real nature and value of cadmium coatings, the following simple experiments were carried out with the hope of obtaining some qualitative results as to the relative potentials of the three metals, consistent with the observed behavior of the metals in service when used as coatings on iron. The experiments were carried out, each of which was repeated at least three times, always with the same results.

1. Small plates, the smallest of which was 1 x 2 in. (2.5 x 5.1 cm.), of low carbon steel, of a composition quite similar to that of ordinary sheet steel, such as is often zinc-coated, and a hole, slightly less than 0.5 in. (127 cm.) diameter, drilled in each, and a cylindrical plug of each of the following metals inserted, one in each steel specimen: aluminum, zinc, cadmium, copper, nickel, tin and lead.

The other metals were not analyzed, but were high-grade commercial products. The plug was fitted very snugly in the hole and the face of the specimen was then planed off and polished, the final finish being given with 00 Hubert (French) emery paper. After cleaning the specimens with (a) moistened emery flour on the tip of the finger, (b) hot water, and (c) alcohol, they were immersed in $N/2$ sodium chloride solution in an enameled tank. All of the speciments were in the same tank, but not in contact with one another.

Fig. 1 shows the results obtained after 18 hours' immersion, and clearly indicates that cadmium and zinc both behaved in a similar manner, in preventing the corrosion of the iron specimens in which they were inserted. The aluminum plug protected its specimen to some extent, but not so completely as the cadmium and zinc. No protection was afforded the steel by any of the other metals in contact with it, and none was to be expected. It would be a difficult matter to explain such a phenomenon if it did take place. The same results were repeatedly obtained, even with several days' immersion.

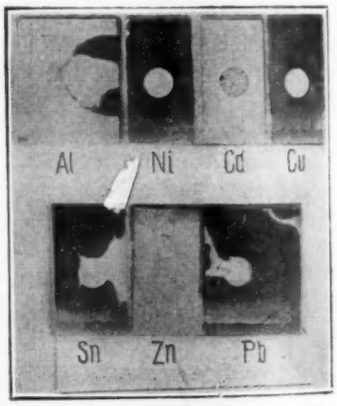


FIG. 1. SPECIMENS OF LOW CARBON STEEL,
in each of which is an insert of another metal, as indicated, immersed 18 hours in $N/2$ sodium chloride solution. The darker specimens are covered with iron "rust." x ½.

The examination of the face of the metal insets after the corrosive action had been allowed to proceed for 48 hours, clearly indicated the source of the "protection" afforded the steel. It is to be expected that if the metal inset protects the steel by functioning as an anode, here should be evidence of this in the appearance of the face of the inset.

Fig. 2 shows the appearance of the various metal insets used, after at least 48 hours' immersion in the sodium chloride solution. In the case of the zinc and cadmium, the macrostructure of the metal was clearly revealed by the etching effect of the anodic corrosion.

[1] Published by permission of the Director, Bureau of Standards, U. S. Department of Commerce.

[2] U. R. Evans, The Electrochemical Nature of Corrosion, Jour. Inst. Met., 30, 241 (1923).

[3] Lewis, G. N., and Randall, M., Thermodynamics and Free Energy of Chemical Substances; Blum, W., and Hogaboom, G., Principles of Electroplating and Electroforming, McGraw-Hill Book Co., New York, 1924; Vinal, G. W., Storage Batteries, John Wiley & Sons, Inc., 1924; Creighton, H. J., and Fink, C. G., Principles and Applications of Electrochemistry, vol. 1 (H. J. Creighton), John Wiley & Sons, Inc., 1924; Washburn, E. W., Principles of Physical Chemistry, McGraw-Hill Book Co., New York, 1921; Thompson, M. de K., Theoretical and Applied Electrochemistry, The MacMillan Co., 1925.

It is well known, from the work which has been done upon metallographic etching reagents, that sodium chloride solution is not an etching reagent for zinc and cadmium under ordinary conditions. The structure of neither of

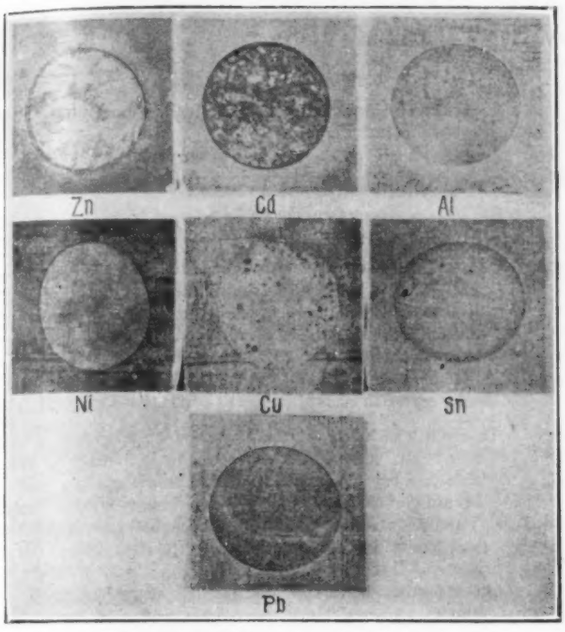


FIG. 2. EXPOSED ENDS OF THE INSERTED METAL PLUGS OF FIG. 1

after corrosion. The macrostructure of the cadmium and zinc was clearly revealed by the anodic corrosion which took place. x 1½.

these metals can be revealed by simple immersion of the metals in the solution. There can be no doubt as to the anodic nature of both of these metals with respect to iron, under the conditions of the experiment.

In the case of aluminum, the crystalline structure of the metal was not nearly so clearly revealed, although in the etched specimen the effect was somewhat more clearly seen that appears in the photograph. No trace of any etching effect was observed on any of the other metal insets.

2. The experiment was repeated with 1.5 in. (3.8 cm.) circular discs of electrolytic iron used in place of the plates of mild steel. Aside from this change the specimens were prepared as before. Four metals were used as insets, 0.375 in. (9.5 mm.) diameter, zinc, cadmium, copper, and chromium, the chromium being commercial metal produced by the thermite process. Each specimen was immersed $N/2$ sodium chloride solution in a glass dish by itself. The electrolytic iron used had been melted into the form of a small ingot, and the chemical analysis of it showed the following results: 0.009 per cent carbon, 0.003 per cent silicon and 0.015 per cent sulfur.

Fig. 3 shows the results obtained, which confirm in every respect those of the previous experiment, concerning the protective action of cadmium. The behavior of the specimen with the chromium inset does not indicate any electrochemical protection for iron when in contact with this metal under the conditions used here.

DISCUSSION AND SUMMARY.

On account of the increasing importance of cadmium as a protective metallic coating on steel and iron, applied either by electroplating or by metal spraying, the determination of the nature of the protection it affords to iron is of some importance. The results obtained, in the experiments just described, show definitely that for the conditions which obtained in carrying out these experiments cadmium stands in the same relation to iron that zinc does. These conditions are, in general, quite representative of those which obtain in service of cadimum-coated iron and steel, although, of course, more severe. Another fact, readily shown by the rate at which the etching of the two metals occurred in carrying out the experiments, is that the potential difference between zinc and iron in contact and immersed in sodium chloride solution is considerably greater than that between cadmium and iron under the same conditions. This, of course, is not shown in the photograph.

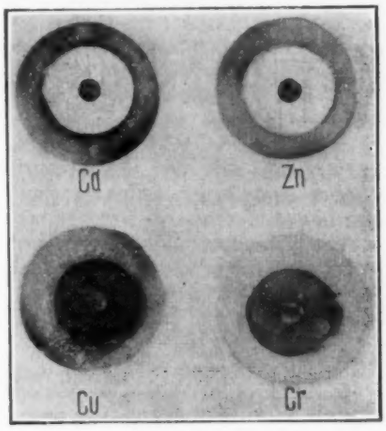


FIG. 3. SPECIMENS OF ELECTROLYTIC IRON,

each containing an insert of another metal, immersed in $N/2$ sodium chloride solution for 20 hours. The darkening of the surface of the iron disc was caused by the corrosion of the iron. The inner circle is the metal insert; the second one, the boundary of the iron disc. Outside of this is the solution. x ½.

Cure for Nickel Itch

Procure some perborate of sodium and peroxide of zinc; both of these materials contain the antiseptic properties of peroxide of hydrogen or dioxogen in their purest form. When using the materials, first wash the hands thoroughly in lukewarm water, dry thoroughly and then immerse in a warm solution of perborate of sodium and water in the proportion of

Water .....2 quarts
Perborate of sodium.....¼ ounce

Immerse the hands in the solution for three to five minutes. Then dry thoroughly and each evening before retiring apply the peroxide of zinc in the form of an ointment. This ointment should be prepared as follows:

Procure some lanolin or white vaseline and add a sufficient amount of peroxide of zinc to form a thick paste or ointment. Rub this ointment into the sores. Continue these applications until the sores are entirely healed.

I would suggest that the men obtain peroxide of zinc soap and use it when washing their hands. If the blood is kept cool by the aid of a quarter of a teaspoonful of rochelle salts in a tumbler of cold water taken each evening before retiring, it will help a great deal to keep the blood in condition.—C. H. Proctor.

Diseases of Brass Deposits

Symptoms, Causes and Cures. Conclusion

Written for The Metal Industry by WILLIAM VOSS *

SYMPTOM	CAUSE	CURE
Thin deposits.	Current too weak.	Increase it; look for electrical leaks, short circuits, etc.
	Solution too low in metal.	Increase metal content.
	Too much cyanide or conducting salts indicated by violent evolution of hydrogen gas and anodes are bright.	Increase metal contents; cut down on alkaline salts.
	Time of deposit too short.	Leave in solution longer.
	Anodes polarized, coated, preventing passage of current.	The addition of caustic soda, ⅛ to ¼ ounce per gallon will help to keep the anodes clean. Rochelle salts, 2 to 4 ounces will help to keep the anodes clean. Brush anodes to keep them clean if the above salts do not help, or bright dip. The most satisfactory solution to this problem is copper anodes as already recommended.
	Solution too cold.	Warm up with steam, coil.
Red deposit.	A red deposit does not indicate an excess of copper. On the contrary it usually indicates an excess of zinc.	To such a solution, if the presence of ammonia is weak or absent, add a little ammonia to just make it noticeable and try the solution. As a rule the slight addition of ammonia will cause a white brass or zinc deposit. This condition confirms the excess of zinc, and copper salt must be added. (Hence the red color gets its name, "Zinc Red"). On the other hand, the addition of ammonia may be all that is required since the copper and zinc content may be right. All that is required is to bring up just a little more zinc which will produce the desired brass deposit. Ammonia is the happy medium.
	Red deposits are also due to weak current, which deposits more copper.	Use proper voltage.
	Solution too warm. This condition usually arises where the brass solution is worked hard (heavy amperage in a small volume of solution or plating barrels). Amperage produces heat, and strong current density means raising the temperature so that more copper is being deposited.	Remedy is to have a by-passed cold water pipe pass through tank so that temperature may be controlled.
	Weak current due to polarization of anodes. Loose or poor connection. Short circuits. Leakage across tank.	Keep anodes clean; this does not mean bright. Look to electrical circuit.
	Too much copper.	The addition of a little ammonia will usually bring up enough zinc to correct this difficulty; if not, a small amount of zinc is necessary.
Deposit does not throw.	Solution lacks conducting salts.	The addition of soda ash will remedy this difficulty.
	Solution lacks metal.	Increase metal content.
	Voltage too low.	Use proper voltage.
	Solution too cold.	Keep at proper temperature—70° F.
White or very pale deposit.	Too much zinc.	Add copper.
	Too much ammonia, cyanide, caustic soda.	Reduce solution and build up with copper. Use copper anodes.
	Temperature too low.	Use steam coils to maintain uniform temperature.
	Voltage too high.	Use proper voltage.
Deposit is patchy and uneven.	Solution lacks enough free cyanide.	Add ½ ounce sodium cyanide to each gallon. This amount can be increased if found necessary.
	Poor contacts.	Keep electrical system clean and maintain good contacts.
	Lack of proper current.	Look to generator. See that uniform current is being developed.
Deposit stains when exposed to air.	There are two common causes of this condition, namely, too much zinc, too much alkali, or perhaps both of these conditions; solution too dense.	Add water to reduce alkali; then increase copper content.
	Lacks free cyanide to dissolve basic salts formed on the deposit.	Increase cyanide content.

* Representative of the Hanson & Van Winkle Company in the Metropolitan District, New York. Part 1 was published in our June issue.

SYMPTOM	CAUSE	CURE
Dark deposits.	Too much arsenic.	If the deposit is very dark gray-black; discard it entirely. It will usually cost more to try to fix it than to make a new solution. It was suggested some years ago to add coke to a brass solution to remove an excess of arsenic. I have still to see this myth materialize. No chemical action takes place when coke is added to such a solution, and since the alkali action is strong, arsenic will remain in solution. The only thing I noted was the absorption qualities of coke and in this respect a sponge has it all over coke for absorbing the plating solution. If only a slight excess of arsenic is present reduce solution by removing some of it and re-building.
Good brass deposit, but turns black or dark when bright-dipped.	Due to arsenic in brass solution.	If articles are to be bright dipped, never use arsenic in brass solution.

Temperature is very important in brass plating and it often becomes necessary to run both steam and cold water pipes through the solution so that either may be used to maintain the proper temperature. Platers who are doing a good deal of brass plating, may find very pale deposits when they start working in the morning in cold weather. By about noon they will be getting a very fine brass color but as the afternoon wears on the color may begin to run bronze; all due to change of temperature, the current warming up the solution steadily throughout the day.

That the nature of the articles have in some cases been the cause of unsatisfactory deposits sounds very queer, but still this is often the case.

I have witnessed large articles being plated in a barrel and the deposit entirely satisfactory. The next load going in lay very close together, like fine nails or phonograph needles, and it was impossible to get a satisfactory brass deposit. The solution continued to give fine results on the larger articles, but it was found necessary to increase the metal content, particularly the copper content, to get uniform results on the smaller articles.

In summing up, I believe the greatest difficulty in proper maintenance of a brass solution is the anode. If we can educate the plater to use copper or 80-20 mixture anodes, there will be less trouble with brass solutions. There will be better and more uniform deposits, better-tempered platers and less worry.

In an effort to keep the brass anodes clean, salts are added that cause trouble with the deposit and continually upset the best balanced solution and the best balanced plater. It is a simple matter to make additions of zinc to get the desired shade, when copper is introduced only by the anode. It certainly is difficult to get it from the brass anodes in the proportion we would like.

The use of copper anodes exclusively in a brass solution is not new. Many of my friends who have tried this method are turning out very fine uniform brass deposits. By this method, the solution is always under control. As soon as the anodes coat up, the plater will make the additions of cyanide. By this method the free cyanide is properly balanced. But in the case of brass anodes the anodes coat over readily and prevent the passage of current which leads to trouble. In an effort to clean up this condition, cyanide in excess is used, caustic soda, Rochelle salts, ammonia, bisulphite soda and what not. With the use of copper anodes on the other hand, we can dispense with all of these salts; even the much heralded ammonia.

If 60-40 anodes are used, alternate with copper anodes which will give better control; but the brass anodes will have to be cleaned by mechanical means from time to time.

It is poor economy to try to save on anodes. Use enough of them, and use anodes that present a large amount of active surface, such as the round or elliptical shape. Flat anodes do not feed the solution properly; the sides of the anodes against the walls of the tank are almost inactive.

Finishing Duralumin

Q.—Can you give us some data on the characteristics of duralumin, as we have had inquiries for castings, in the rough and machined; also the methods employed in heat treatment and annealing.

A.—Duralumin can be cast, forged or stamped so that it may be used for a variety of parts. Casting can be done at a minimum temperature of 690° C. and a maximum temperature of 710° C.

Duralumin can be turned and machined at practically the same feed and speed as brass. It does not seize or drag the tools as do some aluminum alloys. Kerosene forms a good tool lubricant in threading or machining parts leaving a clean-cut surface. A mixture of lard oil and kerosene in equal parts will be found useful for average work. When buffed, Duralumin takes a fine polish similar to silver, except that it lasts longer as it does not tarnish in the presence of sulphuretted and similar gases.

The secret of good Duraluminum lies entirely with the accurate temperatures used in alloying and heat treatment. Annealing should be done between the temperatures of 350° and 380° C. and cooling in air. At this temperature the metal becomes plastic and can be worked and formed into various shapes. The purpose of annealing is to increase the softness and ductility, so that it may be more easily formed into various shapes, such as stampings; also that it may withstand the strains to which it is to be subjected.

The tempering of Duralumin consists of immersing the metal parts in a bath, heated to a temperature of 480° to 500° C., then quenching in boiling water. The bath employed is potassium nitrate and sodium nitrate in equal parts. An important point is the period of time necessary for the material to remain immersed in the bath.—P. W. BLAIR.

Analysis of Plating Solutions

Approved Methods for Analyzing Nickel, Copper, Zinc, Brass, Silver and Gold Solutions. Part 2. From the Monthly Review, March, 1926*

By OLIVER J. SIZELOVE
Newark Branch, American Electro-Platers' Society

INDICATORS

Methyl Orange
Dissolve 0.02 gms. in 100 cc of water

Potassium Iodide KI 10% solution
Dissolve 10 gms. of the C.P. salt in 100 cc of water

Potassium Chromate K_2CO_4 10% solution
Dissolve 10 gms. of the C.P. salt in 100 cc of water

Methyl Red
Dissolve 1 gm. in a small amount of methyl alcohol and dilute to 100 cc.

CYANIDE COPPER SOLUTION

Standard Solution N/10 $Na_2S_2O_3$

Weigh out 24.822 gms. of c.p. $Na_2S_2O_3$, dissolve in water and dilute to exactly one litre in a glass stoppered litre flask.

Standardize this solution against pure copper wire.

Method:

1. Dissolve 0.2 gms. copper wire with 5 cc. of c.p. HNO_3 in a 400 cc beaker.
2. Boil to drive off all NO_2 fumes.
3. Neutralize with NH_4OH and boil.
4. Add 10 cc of $C_2H_3O_2$ and boil.
5. Allow to cool and dilute to 250 cc with water.
6. Add 3 to 4 gms. KI.
7. Titrate with N/10 $Na_2S_2O_3$ solution using starch as an indicator. End point=cream color.

Calculation:

0.2 gms. divided by number of cc of $Na_2S_2O_3$ used= factor for standard $Na_2S_2O_3$ solution.

Example:

31.5 cc $Na_2S_2O_3$ used
0.2÷31.5=0.00635 gms. of copper
∴ Each cc of $Na_2S_2O_3$=0.00635 gms. of copper.

METAL CONTENT OF CYANIDE COPPER SOLUTION

1. Take 10 cc cyanide copper solution.
2. Dilute to 100 cc with water.
3. Add 1 or more cc of concentrated solution of sodium sulphide Na_2S.
4. Make slightly acid with dilute HCL (1:1). The solution should not be made any stronger than N/2 with HCL.
5. Filter and wash precipitate thoroughly with hot water.
6. Transfer filter paper and precipitate to a 400 cc beaker.
7. Add 5 cc of HNO_3 and heat gently until NO_2 fumes are expelled and let cool.
8. Neutralize with NH_4OH and boil.
9. Add 8 to 10 cc of $C_2H_3O_2$ and boil.
10. Allow to cool and dilute to 250 cc with water.
11. Add 3 to 4 gms. KI.
12. Titrate with standard $Na_2S_2O_3$ solution using starch as an indicator. End point=cream color.

Calculation:

Number of cc used x factor x 13.3=oz. of copper per gallon.

Standard N/10 Ag NO_3

1. Weigh accurately 17 gms. c.p. Ag NO_3 crystals.
2. Dissolve in distilled water and dilute to exactly one litre in a glass stoppered litre flask.
3. Weigh approximately 0.5 gms. Na CN in weighing bottle.
4. Dissolve in distilled water and dilute to 100 cc.
5. Add 0.2 cc of 10% KI solution.
6. Titrate with N/10 Ag NO_3 until faint turbidity appears.

Calculation:

The number of cc used divided into 0.5 gms. Na CN= factor.

Example:

.498 gms. Na CN taken.
47.3 cc of N/10 Ag NO_3 used.
0.498÷47.3=0.0105.
∴ Each cc of N/10 Ag NO_3=0.0105 gms. Na CN.

FREE CYANIDE CONTENT OF COPPER SOLUTION

1. Take 10 cc copper cyanide solution.
2. Dilute to 100 cc with distilled water.
3. Add a few drops of N/10 KI solution.
4. Titrate with N/10 Ag NO_3. End point=faint turbidity.

Calculation:

Number of cc of Ag NO_3 used x factor x 13.3=oz. of free sodium cyanide per gallon, or each cc of Ag NO_3 used=0.005208 gms. of CN per gallon.

ZINC CYANIDE SOLUTION

Standard Solution N10/$K_4Fe\,CN_6$.

Weigh out 21.63 gms. $K_4\,Fe\,CN_6$ and 7 gms. Na_2SO_3. Dissolve in distilled water and dilute to exactly one litre.

1. Weigh out 0.3 gms. of pure metallic zinc.
2. Dissolve in 10 cc of HCl (1:1) in a 250 cc beaker.
3. Dilute to 150 cc with water and heat to 140° F.
4. Add 1 cc of $Ur_2(NO_3)_2$.

Note:

$Ur_2(NO_3)_2$ solution made by dissolving 5.2 gms. $Ur_2(NO_3)_2$ in 100 cc of water.

5. Titrate with $K_4Fe\,CN_6$ using $No_3(NO_2)_2$ as an outside indicator. End point=faint brown color.

Calculations:

60 cc K_4FeCN_6 used.
0.3÷60=.005.
∴ Each cc of Standard K_4FeCN_6=.005 gms. of zinc.

METAL CONTENT CYANIDE ZINC SOLUTION

1. Take 10 cc zinc cyanide solution.
2. Dilute to 50 cc with water.
3. Heat to 140° F.
4. Add saturated solution of c. p. crystallized Na_2S
5. Digest and filter.

*Part 1 was published in our June Issue.

6. Wash twice with warm water to which a few drops of the saturated Na_2S solution has been added.
7. Transfer precipitate and filter paper to 250 cc beaker.
8. Add 10 cc c.p. concentrated HCl and a few Na_2SO_3 crystals.
9. Boil to expel H_2S.
10. Dilute to 150 cc and heat to 140° F.
11. Add 1 cc Uranium nitrate $Ur_2(NO_3)_2$.
12. Titrate with standard $K_4Fe\ CN_6$ using $Uo_2(NO_3)_2$ as an outside indicator. End point=faint brown color.

Calculations:

Number of cc of $K_4Fe\ CN_6$ used x the factor x 13.3 = oz. of zinc per gallon.

Example:

18 cc of $K_4Fe\ CN_6$ used.
18x.005x13.3=oz. of zinc per gallon.

FREE CYANIDE CONTENT

The usual method of determining the free cyanide in cyanide zinc and brass solutions with N/10 Ag NO_3 is inaccurate when Na OH is used in the plating solutions. By using Cu $(NO_3)_2$ in place of Ag NO_3 the result, while it may not be as accurate as desired, is far the best that can be given at present, for the Na OH does not interfere with the titration.

Standard Solution N/10 Cu $(NO_3)_2$

1. Weigh 24.16 gms. c.p. Cu $(NO_3)_2$
2. Dissolve in water and dilute to exactly 1 litre.
3. Weigh approximately .5 gm. Na CN in weighing bottle.
4. Dissolve in water and dilute to 100 cc.
5. Add 10 cc c.p. NH_4OH.
6. Titrate with N/10 Cu $(NO_3)_2$ until a faint purple color remains after standing for a minute.

Calculations:

The number of cc Cu $(NO_3)_2$ used divided into the weight of the Na CN taken=factor.

Example:

.496 gms. Na CN taken.
26.6 cc Cu $(NO_3)_2$ used.
.496÷26.6=.0186.
∴ Each cc N/10 Cu $(NO_3)_2$=.0186 gms. Na CN.

Free Cyanide Content of Zinc Solution

1. Take 10 cc zinc solution.
2. Dilute to 100 cc.
3. Add 10 cc c.p. NH_4OH.
4. Titrate with N/10 Cu $(NO_3)_2$. End point light purple color.

Calculations:

Number cc Cu $(NO_3)_2$ use x factor x 13.3=oz. free sodium cyanide per gallon.

BRASS SOLUTION

METAL CONTENT OF BRASS SOLUTION

1. Take 10 cc of solution.
2. Dilute to 50 cc and heat to 140° F.
3. Add while constantly stirring a saturated solution of c.p. Na_2S. Zinc will be precipitated, the copper will be left in solution.
4. Filter zinc sulphide precipitate and wash twice with warm water to which a few drops of the saturated Na_2S solution has been added.
5. Save filtrate for copper determination.
6. For zinc determination follow method given under "Cyanide Zinc Solution." Start with operation No. 7.
7. For copper determination follow method given under "Cyanide Copper Solution." Start with operation No. 4.

FREE CYANIDE CONTENT OF BRASS SOLUTION

Same as for determing free cyanide in cyanide zinc solution.

SYMBOLS

Na_2S=Mono Sodium Sulphide C.P.
NH_4OH=Ammonium Hydroxide
$C_2H_3O_2$=Acetic Acid
KI=Potassium Iodide
$Na_2S_2O_3$=Sodium Hyposulphite
$Ur_2(NO_3)_2$=Uranium Nitrate
$K_4Fe\ CN_6$=Potassium Ferrocyanide
Na_2SO_3=Sodium Sulphite
Ag NO_3=Silver Nitrate
Na CN=Sodium Cyanide
H Cl=Hydrochloric Acid
H NO_3=Nitric Acid

ACID COPPER SOLUTION

Standard Solutions and Indicators

Sodium thiosulphate ($Na_2S_2O_35H_2O$), 24.822 grams per litre.
Oxalic acid ($C_2H_2O_4\ 2H_2O$), 2 grams.
Starch solution, 1 gm. to 100 cc H_2O.
Methyl Orange .01 grams per 100 cc H_2O.
Phenolphthalein ($C_{20}H_{14}O$) 1 gram to 100 cc neutral alcohol.

For the metal content, what is known as the iodide method is used, which consist of converting the copper into cuprous iodide (Cu_2I_2) and titrating with a solution of sodium thiosulphate, using a starch solution as an indicator.

The end point is so exact that with a little practice it can be determined to within one drop of the sodium thiosulphate solution.

Standardizing Sodium Thiosulphate ($NA_2S_2O_3$)

Weigh out exactly .2 gm. pure copper wire, dissolve in 5 cc C.P. H NO_3, boil to expel NO_2 gas. Let cool, dilute with 25 cc H_2O, and neutralize with ammonium hydroxide (NH_4OH), boil and add 10 cc acetic acid ($C_2H_3O_2$). Let cool, dilute to 150 cc with H_2O and add 3 gms. potassium iodide (KI). This causes the solution to turn brown and the copper has been converted to cuprous iodide (Cu_2I_2). Titrate with the sodium thiosulphate solution until the brown color becomes quite light. Now add 1 cc of starch solution, this causes the solution to turn to a blue color. Continue titration with the sodium thiosulphate solution with constant stirring until the color changes to a cream color. Let stand for a few minutes and if solution does not change to blue color the end point has been reached.

Calculations:

Say that 31.5 cc sodium thiosulphate has been used, 2 divided by 31.5=.00635. Therefore, 1 cc. sodium thiosulphate is equal to .00635 grams copper.

FOR METAL CONTENT OF PLATING SOLUTION

Take 5 cc of the acid copper plating solution, add 25 cc H_2O and neutralize with NH_4OH. Boil and add 10 cc acetic acid. Dilute to 150 cc with H_2O, let cool, add 3 grams K I, and titrate with $Na_2S_2O_3$ using starch as an indicator.

Example:

41 cc $Na_2S_2O_3$ are used.
1 cc $Na_2S_2O_3$=.00635 grams copper.
41x.00635x26.6=6.92. Therefore, each gallon of solution contains 6.92 oz. copper.

Standardizing Caustic Soda (NA OH)

Take 2 grams oxalic acid, dissolve in water and dilute to 100 cc, add a few drops of phenolphthalein and titrate with the caustic soda until a light red color persists.

Say that 64 cc are used and the following reaction takes place:

$H_2C_2O_4.2H_2O+TNa\ OH=Na_2C_2O_4+4H_2O$

Mol. wt. $H_2C_2O_4.2H_2O=126$

Mol. wt. 2 Na OH=80

Therefore, 126:80::2:x

x=1.27

Or we find that 1.27 grams caustic soda react or neutralizes 2 grams oxalic acid. If there was 1.27 grams caustic soda in 64 cc, 1 cc would equal 1.27÷64 or .0198 grams Na OH.

$2\ Na\ OH+H_2SO_4=Na_2S\ O_4+4H_2O$

Mol. wt. 2 Na OH=80

Mol. wt. $H_2S\ O_4=98$

or 80 parts Na OH react with 98 parts $H_2S\ O_4$.

Therefore, 80:98::.0198:x

x=.0242

Each cc Na OH equals .0242 grams H_2SO_4.

FOR ACID CONTENT OF PLATING SOLUTION

Take 10 cc of the plating solution, dilute to 100 cc with H_2O, add a few drops of Methyl orange and titrate with the caustic soda solution to a slight yellow color.

Example:

30.5 cc Na OH used.

1 cc Na OH=.0242 grams H_2SO_4

30.5x.0242x13.3=9.816 ozs. avd. H_2SO_4 per gallon of solution.

9.816÷1.84=5.33 fluid oz. H_2SO_4 per gallon.

ACID ZINC SOLUTION

METAL CONTENT

Take 5 cc solution in 250 cc beaker, dilute to 25 cc and neutralize with Na_2CO_3. Add 10 cc c.p. H Cl and further dilute to 150 cc. Heat to 140° F., add 1 cc $Ur_2\ (NO_3)_2$ and titrate with $K_4Fe\ CN_6$, using $Ur\ (NO_3)_2$ as an outside indicator.

Calculations:

Number of cc $K_4Fe\ CN_6$ used x factor x 26.6=oz. of zinc per gallon solution.

ACID CONTENT

Take 10 cc of the solution in 150 cc beaker, dilute to 100 cc. Add 2 or 3 drops methyl orange and titrate with N/10 Na OH. End point light yellow color.

Calculations:

Number cc Na OH used x factor x 13.3=oz. avd. $H_2\ SO_4$ per gallon.

Oz. H_2SO_4÷1.84=fluid oz. H_2SO_4 per gallon.

Note: $K_4\ FeCN_6$ standardized for factor same as for zinc cyanide solution.

N/10 Na OH standardized for factor same as acid copper solution.

BLACK NICKEL

The metal and acid content are determined the same way as given under the analysis of nickel solution.

ZINC CONTENT

Take 10 cc of the black nickel solution in a 250 cc beaker, dilute to 25 cc and add enough sodium cyanide to convert the nickel and the zinc into a double cyanide of nickel and zinc solution. Heat to 140° F. and add saturated solution of sodium sulphide (Na_2S). Digest, filter and follow with operation No. 6 under zinc cyanide solution.

AMMONIUM SULPHOCYANATE CONTENT

Take 10 cc of plating solution, dilute to 100 cc. Make slightly acid with H_2SO_4. Add 10 drops of a 10% solution, iron ammonium sulphate, $Fe(NH_4)_2\ (SO_4)_2$ and titrate with N/10 $AgNO_3$ until red color of solution disappears.

Calculations:

Number of cc N/10 Ag NO_3 used x factor x 13.3=oz. NH_4 CNS per gallon.

Standardizing

Ag NO_3 for ammonium sulphocyanate (NH_4 CNS) content.

Weigh approximately .3 gm. of ammonium sulphocyanate, dissolve in water and dilute to 100 cc. Make slightly acid with H_2SO_4, add 10 drops of a 10% solution of iron ammonium sulphate and titrate with N/10 Ag NO_3 until red color of solution disappears.

Example:

.267 gms. NH_4CNS taken

34.5 cc Ag NO_3 used

.267÷34.5=.00744

∴ each cc N/10 Ag NO_3=.00744 gms. NH_4CNS

[This article will be concluded in an early issue.—Ed.]

Dark Statuary Bronze

I have found the following solution very satisfactory for a dark statuary bronze solution:

Water	1 gal.
Potassium chlorate	3 ozs.
Copper sulphate	3 ozs.
Sodium hyposulphite	3 ozs.
Copper acetate	3 ozs.

Use hot, in some cases nickel sulphate may be added.—Andrew V. Re.

Spotting Out

I have eliminated a lot of spotting out trouble with cyanide solutions as follows: When articles are finished or plated, and the operator is removing same from copper, brass or whatever solution it may be, immerse them in cold water, then in hot water with a small quantity of lime in solution. This will make the water softer and it will not streak. Use reverse current in the hot water solution. The plater will notice that it has the tendency to take the cyanide out of the pores. When dry, use a good grade of lacquer.—Andrew V. Re.

Refinishing Brass Curtain Rings

When refinishing old brass curtain rings that are lacquered, make a good strong cleaning solution, and have it hot, in either a half of a barrel, crock, or something similar to that. Use reverse current with a double throw switch. In that way the operator will loosen up the lacquer and take it off; first straight and then reverse current. Put them in a wire basket, so that 200 to 300 can be cleaned at once. Rinse same in cold and hot water. Place them in a tumbling barrel, running about 18 to 20 revolutions with either ground pumice stone or white sharp sand, the same as used for sand blasting. This will give a satin finish. If it is a little too dark, bright dip them a little, and they will still be satin finished rings.—Andrew V. Re.

The Fundamentals of Brass Foundry Practice

A Description of the Basic Laws Which Control the Melting and Casting of Metals and Their Application to Practical Foundry Operations*—Part I

Written for The Metal Industry by R. R. CLARKE, Foundry Superintendent

INTRODUCTION. BASIS OF THIS BOOK

Within the past year the author has presented his illustrated lecture, "The Foundry Physicist" before the leading foundrymen's associations of the country. On each occasion he was requested to compile the lecture into book form in order that it might have record and that a larger element of the foundry public might benefit by its practical matter and value. This series which is to be collected in book form is the author's response to this request.

The primary object of the book is a better understanding among foundry workers of the fundamentals of foundry practice. Its subject matter reaches out to those physical forces, causes and conditions that dominate the casting art, and those unfailing laws and principles that actuate these forces. They are the same forces and causes we deal with every day in our foundries and the identical laws and principles that are constantly decreeing our castings whatever they turn out to be.

The subject in part is unavoidably scientific. All fundamentals are essentially that. We cannot go to the "basis of things" without engaging the "science of things." This admission, once made, may tend to discourage practical men from this book. Nothing could be more erroneous. For them, the book is intended; in their language, it is written; to their understanding, it appeals. Men, purely practical, have for some reason or another always misunderstood science as a bundle of complexities. Science itself pleads for a kinder verdict. Science knows no mysteries and will tolerate none. It is only when things reach their simplest, clearest, plainest, most comprehensive form that they become truly scientific.

Between the language of science and the language of practice there is an undoubted distinction. This difference we have endeavored to adjust, all in the practical man's favor. In the following pages, wherever a common word could possibly be substituted for the scientific term, we have made that substitution. To elucidate the text further, a glossary has been added, of the scientific terms employed, defining each term concisely and explaining it clearly. With these facilities in mind, we believe that any practical foundry worker of average intelligence can take the book, read it, understand it and profit by it.

The book has absolutely nothing to do with abstract theory. It proceeds directly from the practical side of the question; from the castings made and lost, the troubles encountered and the remedies applied through twenty-five hard years of practical foundry experience. Every illustration submitted is an item in this experience and is taken as a part of the practical reasoning by which the difficulty was actually overcome. Instead of reasoning from "cause" to "effect," the order throughout has been to trace from "effects" as exhibited in the casting, back to the "causes" that produced them, so that if there be any theory at all about the book, it is the theory of practice rather than the practice of theory. To correlate cause and effect is an easy matter when causes are understood and effects studied. Such is the nature of this book, to expound physical causes and to identify them in physical effects. If any further encouragement is needed to venture the publication of the book, it is furnished by the reception given the lecture referred to. In every instance the audience made up of practical foundrymen—manifested the keenest interest and attention throughout and followed with a general discussion that ran late into the night.

In submitting the work to the foundry-reading public, the author hopes to work up a similar interest and to be privileged to serve, more widely, an art to which he has applied his powers of mind and hand throughout the greater part of his life.

CHAPTER 1. THE PHYSICAL AND CHEMICAL PHASES OF FOUNDING

If we glance at Figures 1 and 2, which represent the crown cross section of an axle lining, we note that both castings are defective, No. 1 having a check or shrink-crack in the metal adjoining the light and heavy sections of the casting; No. 2 indicating porous metal. For these defects there must have been some cause. But the cause of No. 1 is entirely different from that of No. 2. Physical action produced No. 1; chemical action is responsible for No. 2.

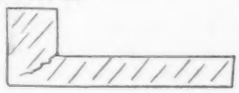


FIG. 1. PHYSICAL DEFECT

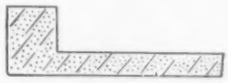


FIG. 2. CHEMICAL DEFECT

In the founding of any casting these two great and fundamental causes are constantly at work, producing changes or effects in kind, namely, physical changes or effects and chemical changes or effects. Between the two are broad distinctions. Physical change is mere change of form, substance remaining the same. Chemical change on the other hand is a complete change of substance. In Figure 1, the metal is pure and clean. In Figure 2, it has suffered from included gases and is possibly seriously oxidized. The metal zinc can be taken to illustrate the difference between physical and chemical change. Reduced to its liquid state or cast or forged to different shape, or even pulverized, a piece of zinc remains in substance zinc, because it has suffered only physical change. But subjected to extreme temperature, the zinc will change to its oxides, entirely different substances from zinc, and formed about through chemical change. All porosity of metal coming from included gases, all oxides and oxidized metal, all reactions of deoxidizers and degasifiers, such as phosphorous, magnesium, silicon, etc., are chemical changes or effects that proceed from chemical causes. They lie in the field of the chemist and metallurgist and in the best foundries of the day are on a scientific basis of control. All shrinking, checking, swelling, scabbing, core-floating, core-blowing, mis-running, etc., of castings are physical effects, deriving from physical forces and causes. From this it is apparent that the great bulk of chemical defects in our castings originate

in the melting and the alloying of metal, while the physical defects are brought about chiefly in the molding.

WHAT IS PHYSICAL LAW?

Physical defects in castings result from physical forces and causes at work and can be scientifically controlled only by obeying these forces and causes. In the following pages we shall have much to do with these physical laws and principles as applied to castings, dominating these forces and causes, so it might be best at once to inquire, "What is physical law?"

First of all, it is a method of operation. It can produce no physical effect, but it does decree how physical forces and causes shall work to bring these physical effects about. To illustrate: if a ball is thrown into the air with a certain force it will rise to a certain height and return to the earth in a certain time. Now the force of gravitation, not the law of gravitation, stopped the ball and brought it back. But the law of gravitation decrees how the thing should be done and demands that it always be done in absolutely the same way and with absolutely the same results, so that the same ball thrown into the same air with the same force and under the same conditions a thousand times will rise to absolutely the same height and return to the earth in absolutely the same time each and every time. Again, a certain gate draws a certain hole in a certain casting. Now the force of contraction, not the law of contraction caused the hole. But the law of contraction governs the operation and decrees that under identical conditions the same gate draw the same hole in the same casting throughout all infinity. From this, three distinguishing features of physical law appear. It compels physical forces or causes: first, always to operate; second, always to operate in absolutely the same way; third, always to produce absolutely the same results. Decreed consequences are therefore, unescapable. A molder making nine good and one bad casting at the same time and from the same metal might honestly insist he made them all exactly the same, but the authority of law is against him and he did not. In some small detail he varied, because natural laws cannot fail. The beauty of all this is that if we try a method in our foundries and that method produces properly, then that method has the sanction of law and will reproduce absolutely the same and forever.

FOUNDING AN ART AND A SCIENCE

True founding is both a science and an art; a business of the head and the hand. Its science is the systematized knowledge of its fundamentals, of its great truths in the nature of causes, forces, laws and principles. Its art is the application of this knowledge. For instance, a molder may know how to ram sand to any degree of hardness or softness, but he must know also what degrees of compactness different sections of his mold require and why. He must appreciate the difference in principle between metal merely lying up against a green sand wall and metal enveloping a green sand volume. He must know how to light a core vent, but he should also know the fundamental reason, the "principle" of lighting a core vent. That is the science of the business. Its art is its skill or handiwork. The author's experience leads to the belief that the great majority of molders are more artful than scientific; they are better with their hands than their heads. This is no reflection whatever on molders' intelligence. Its the way thay have been trained, along with the natural fact that men, in general, develop skill faster than they discover knowledge. In their study and their practice not many molders exhaust fundamentals. It is this, we believe, that has led to the vast majority of defective castings in the foundry. Over and again we have scrapped castings that from their very principles of molding could never have been anything but defective. Almost any foundryman, no doubt, has had similar experiences. The only escape is to educate in fundamentals, causes, reasons, whys and wherefores, and in laws and principles. Because in the foundry, if anywhere, we must know the forces and causes we have to contend with and their set ways of doing things. Without this knowledge molding and founding in general become mere chance propositions.

This series will be continued in an early issue.—Ed.

Chased Ingot Mold

Q.—I got up an alloy for dental purposes and wish to sell it in two ounce ingots. These ingots will be ¼ inch or ⅜ inch thick and the face of it will have a design. I wish you would tell be how I can get the lettering full and sharp in an open plain ingot mold. I have tried brass, aluminum and plaster paris, but could not get the letters sharp in any of them.

A.—I suggest that you have your mold made out of steel and made by a competent maker of this class of work. A number of firms in your city can do this work and give you the results you desire. Your metal appears to contain a large percentage of lead and a mold made from any other material, we are afraid, will not be satisfactory.—W. J. REARDON.

Casting Gears

Q.—I am in need of information with reference to gating gears and other castings made of an 88-10-2 mixture? The gears range in weight from 60 to 500 pounds. Also is the horn gate any better than the cut gate?

A.—It is the practice of makers of such castings, as you speak of (gears weighing 60 to 500 pounds), to cast in core molds or carbon molds, as this method has a chilling effect so much desired in this class of work. To produce a close even-grained metal the castings in general are gated from the inside and from the bottom.

Transactions of the American Institute of Metals, Vol. IX, 1915, will give you some information on 88-10-2 alloy. —W. J. REARDON.

Bright Finish on Composition

Q.—How is the bright clean red color given to the finished plumbing goods, made of 85-5-5-5 ingot?

Our workmanship is up to the average standard as to color and what I need is a treatment which brings out or produces both a deeper and brighter color than that which ordinary good 85-5-5-5 carries.

A.—There is no treatment either chemical or plating that will give the original bright clean red color so much desired in valves and cock work. The method to obtain this color is through mixture. Some new metal must be added to the mixture if scrap is used. It must be free from iron, phosphorus and aluminum and 10 per cent new metal added. It will not be necessary to add the tin: this can be figured in the ingot, but the new or the scrap copper, clean and free from solder, should be added to approximately 10 per cent, and this will sweeten up the mixture, if the castings are dipped in water at the proper temperature after pouring, which for valves is approximately five minutes after pouring. This can be determined by trial as to the proper time.

The other method where no new metal is used is to rumble the castings and dip in acid bright dip for color.—W. J. REARDON.

Metallurgy in Silversmithing

The Place of the Metallurgist in the Silverware Manufacturing Plant*

By J. B. WATERFIELD, Superintendent, The Watson Company, Attleboro, Mass.

It was the late Sir Roberts Austin who defined metallurgy as that science which consists of five per cent chemistry, five per cent physics, five per cent mechanics and the balance horse sense, making in terms of the foundryman, an eighty five-three-fives mixtures. I am sure that in its application to my subject the proportions are not very far off.

The noble metals used are iridium, platinum, palladium, gold and silver. The base metals are copper, zinc, cadmium, tin, nickel, chromium and cobalt. The alloying and electro-plating of these metals is an intensely interesting and fascinating study.

HIGH PRICED METALS

Let us look at the market price of these metals as quoted: iridium, $325.00; platinum, $110.00; palladium, $75.00; gold, $20.67; silver, $0.66. You can readily see that an iridio-platinum alloy containing ten per cent iridium is worth about $25.00 more an ounce in metal value than a palladio-platinum alloy with ten per cent palladium. To influence people to buy the former—that is the customer who is very exacting and asks why—you have to go into details and explain from a metallurgical standpoint how the addition of the iridium makes it so resistant to abrasion and wear that, for instance, high grade fountain pen companies use this alloy exclusively for their pen points. This generally convinces the buyer who almost invariably has used pen points of this type, and with very little stretch of the imagination can visualize a ring or broach with prongs made of this hard material.

GOLD

Gold is more diversified in its jewelry metallurgy than any of the other metals. We have gold alloys of every conceivable karat, from nine up to twenty-two, and by using varying amounts of nickel, copper, zinc or cadmium, these different karat alloys can be made in various shades of red, yellow, green and white. Ofttimes we use what is termed "rolled plate." For example an alloy of twelve karat gold is soldered onto a bar of copper-base metal, in the proportion of one-tenth of the gold alloy to nine-tenths of the base metal, and this is termed "one-tenth, twelve karat plate." In the same way you can have a one-twentieth, a one-thirtieth, one-fortieth or a one-sixtieth plate, with a varying karat surface alloy. For wire, there is a shell or tube of the required karat gold alloy soldered to a core of base metal, with the above-plate-karat variations. Recently this has been improved further by using a fine core of solder. This innovation has greatly facilitated the making of chain material.

ELECTRO-GOLD

Then there are the various gold solutions for electroplating base metal. In this department the metallurgist can tell definitely what is being done. Suppose, for example, we buy a very good white gold anode, and six months later in ordering the same alloy from the same concern, we receive a very poor one. We can easily make a qualitative test for silver, nickel, copper, zinc and cadmium, and then determine them quantitatively. With the following known conditions in a coloring bath, the problems of gilding are simplified.

Analysis of anode.
Analysis of solution.
Temperature and density of bath.
Voltage and current density.

Knowing these facts balances the processing and puts control in the hands of the management.

SILVER FACTORY

Let me take you through a modern silver plant to explain and point out the places of vital interest to the metallurgist. First comes the power house. These are some of the questions which you ask as you enter. How much fuel are they using? What kind of fuel? How much does it cost laid down in the boiler room? Can a cheaper substitute be used to replace a part or whole of their present supply and still get the same efficiency from their boilers? The fuel end of a company is always the first thought in the mind of a metallurgist who has had smelter experience. It is somewhat analogous to percentage of coke or oil consumed to ore and flux smelted.

Then there is the water examination, testing and treating, pumps, traps and hot water systems to be given more than a superficial inspection. At one plant perhaps a steam trap has been connected up wrong and is blowing through into the spillway instead of being returned to the boilers, while another trap on top of the boilers that was used to take care of the condensate from the header is blowing through into the make-up tank for the feed pump. I am mentioning these facts simply to show that a metallurgist can and very often has to assume some of the duties of a master mechanic. He gives the purchasing department his recommendations as to what coal, coke or fuel oil they should buy; and so on down through the line of supplies.

CHECKING AND ALLOTING RAW MATERIALS

Now in regard to the actual processing of the silver. As the silver bullion comes into the vaults he should see that it is carefully weighed and in case of any doubt as to the fineness of any one bar, he should assay it. He must see that the copper received is the same that is specified in the purchase order. He supervises the making-up of the various alloys, keeping the proportions of virgin metal to scrap well within the limits that he knows to be good practice in later fabrication. Inasmuch as metal going into spoons and forks must be very hard and tough, seventy per cent skeleton scrap can be used, while for the deep drawn hollow ware it is best to use only between twenty and thirty, because hardness is not quite so essential as malleability and ductility.

MELTING AND POURING

The melting heats should be watched to see that the metal is poured at the correct temperature; also that the molds are correctly oiled and just hot enough to prevent the dressing from being dried. This is a very important, if not the most important part of the work, for upon the correct melting and pouring with careful annealing depends the success or failure of the subsequent operations.

*From a lecture delivered before the Boston Section of the American Institute of Mining and Metallurgical Engineers, March 1, 1926. Published for the first time in THE METAL INDUSTRY.

DRESSING, ROLLING AND ANNEALING

After the bars are dressed, they are weighed and passed between 20″ x 36″ rolls and broken down to ¾″, annealed, straightened and scraped to remove all surface defects as far as possible, re-rolled and again annealed. Sterling silver consists of 925 parts fine silver and 75 parts of copper. It is this latter metal that the chemist tries to keep from being oxidized during the various annealings, and it has been found that by covering the sheets with boracic acid hardly any perceptible "fire" (as the silver-workers term the oxide) penetrates this fluxing coat. Of course, we have non-oxidizable furnaces which are very serviceable, and keep out nearly all of the fire coat or oxide, by using a water seal for charging and discharging their product. At present I am experimenting with a double chamber furnace which I think will revolutionize annealing. In one chamber lined with very refractory fire-brick there is a double steam coil made of extra strong pipe. This is heated by using a triple burner so arranged as not to impinge directly on the coil. The second or annealing chamber is simply a hollow two-compartment jacket. The method of procedure is to heat chamber No. 1 and then pass live steam through the coil and directly to the center of chamber No. 2 and let it exhaust through the side walls with a ten or twenty foot head of piping for back pressure. The steam enters the coil at 40 pounds pressure and is so regulated that in passing through chamber No. 1 it is superheated to twelve or thirteen hundred degrees F. before discharging into chamber No. 2. In five minutes this chamber is heated to 900° F., and as there is no appreciable air there is no chance for oxidation. This is still in an experimental stage, however.

STAMPING AND SPINNING

After the metal has left the rolls it goes to either the stamp room or the spinning room. Here it is cut into the various shapes required in later operations. In the stamp room there are twenty stamps with drops ranging in size from one hundred to thirteen hundred pounds. Some of these are worked automatically, while others are attached to a leather belt passing over a revolving pulley, and when the operator tenses the belt it is lifted easily (by pressure of ten or fifteen pounds in case of the lighter hammers, and not more than twenty-five or thirty in the case of the thousand and thirteen hundred type) then suddenly released, and changes an ordinary blank into a beautifully shaped spoon or fork or possibly a tray or a side of a water pitcher. In this same room you will see knuckle joint presses capable of exerting a pressure of a thousand tons. Well, what has the metallurgist to do in a silver stamp room? He should be thoroughly acquainted with the various steels and irons used in the dies, and with the steel, lead, tin and composition alloys that are used as forcers; he should test the alkaline cleaners and acid dips to keep them up to their strength and prevent them from varying from the standards that are considered to be the best practice.

MANUFACTURING DEFECTS

Watch all complaints as far as materials are concerned, and be just in allocating the blame for defective parts in process. At one plant my attention was called to "steel" in the sheet stock. The strange thing about it was that it was never discovered until after the metal had been worked, and then the reason for seeing it was that, being harder, it had cut its way to the surface! We found that the men, when they were pickling the work after annealing, did not always give it sufficient time to allow the tiny beads of slag from the fused boracic acid to become loose from the surface of the silver, and when the article was struck, it hammered the particles into the surface of the metal. Sometimes by the use of a powerful glass you can convince a foreman that his man is not cleaning the dies properly. There are times when the metal for some reason or other will be to blame, and the thing to do is to go to the department head responsible, and register an honest-to-goodness kick.

In the press and spinning department, sheet metal that has a circular section is prepared in blanking and drawing presses, and afterwards shaped up on a wood or steel chuck. Here again consistent inspection and care save dollars in defective material. Several times we have had men say that the metal was bad. Frequently a little investigation would show that the draw tools were not just right, or the pressure plate was bearing hard on one side, or a sliver of metal had got caught on the under side of the plate, or in annealing the silver between operations it had been overheated. It is rarely that we find the fault in the metal itself.

The products from these two departments converge in the making-up department; here they are assembled and soldered. Again it is essential to watch the various pickles and see that they are not too strong, for otherwise they would eat out the solder, as nearly all silver solder contains zinc in varying proportions. Here also you have to see that the work is well covered; otherwise it is liable to oxidation, and at this stage no part of the piece can be permitted to suffer from a fire coat. Find out how the various solders are working. There are generally four of these, varying from "hard," which melts a little lower than sterling silver, to "easy" running, which explains itself.

FINISHING

Sandwheeling, polishing and finishing are the next prime operations. There are several marks on the surface of the silver that have to be eliminated before it is ready to be sold, and this is done in the finishing room. Finishing is the process of obtaining a surface of high lustre. On lathes revolving at five or six thousand r.p.m. are fastened wheels of leather made from the hides of the sea lion. Between these wheels and the piece being finished is fed very finely ground pumice stone, about 250 mesh. It has been found by actual experience to be the best material to remove the scratches and marks that accumulate on the silver during its previous workings. There is a certain amount of oil used to dampen this fine stone so that it will stick to the wheel and not dust too much. The operator tries to cut across the lines, for otherwise they would drag deeper, and much more silver would be lost in arriving at the same surface. The analysis is: pumice, about 72%; silica, 17%; alumina, 2%; ferric oxide and sodium and potassium oxide, 9%. From the sand polisher it goes to the grease buffer. The same type of lathe is used when the wheel is made of wool, felt or cotton and the abrasive is a finer one, being tripoli (a decomposed silicious limestone-rotten stone) or crocus (a red or yellow oxide of iron) with suitable binders. Afterwards the work is passed to the polisher who uses different grades of rouge for getting the highest possible mirror finish to the work.

The metallurgist has to see in this department that the abrasives used are not too coarse or too fine; for in the one case the operation although being done faster, would throw more of an effort on the following operation, and the final result would not be as satisfactory. There are as many brands of abrasives as there are of copper, and you can get the best results only by using the best or better grades. Of course, there are rouges that are sell-

ing as high as $5.00 a pound, but where it is good practice to use this material on white gold or platinum it would be altogether out of the question to use it on silver.

Soaps and cleaners can be carefully studied here as to their merits, and tests made to ascertain which will give the best results. Very often a change of the heads in barrels has caused the material to be judged good or bad by the user.

PLATING AND COLORING

This is where the metallurgist can so regulate his solutions as to have them under perfect control. He can test his solutions once a week and make the necessary additions of chemicals to keep them up to standard. Here as in the melting it is necessary to have absolute cleanliness and systematic analyses and carefully to salvage the waste solutions.

SALVAGING WASTE

There are several other places in a silver factory where the metallurgist has problems to solve, the final one being the sweep and refining department. Here the refuse from all over the plant is collected and burned, crushed in a mill and the crushed product passed over a concentrating table. The tailings running minus 60 mesh are sampled and shipped to the highest bidder. The concentrate is melted and fluxed, run into bars, sampled and sold to the United States Government. Before any of the waters from the plant are thrown away, they are passed through a series of tanks baffled and filled with scrap iron to precipitate all valuable metals. These tanks are tested qualitatively every week for gold, silver and copper.

At one plant through the proper introduction of twenty-five or thirty barrels of brick bats containing gold and silver values to a grinding mill and a concentrating table, I was able to add a considerable amount to the profit side of the ledger.

At another plant they used a tremendous excess of salt in throwing down silver chloride, and the superintendent was somewhat perturbed when he found that silver was slightly soluble in such a concentrated solution.

At still another plant everything is blamed to oxides, when as a matter of fact they might just as well blame it on cowhides.

QUALITIES OF A METALLURGIST

In conclusion let us summarize the qualifications of a good metallurgist. Technically he is a combination of a chemist, physicist and engineer. Commercially he must have a thorough understanding of organization and control and realize that plants are run for commercial gain and not metallurgical finesse, although one is often coincident with the other. To arrive at greater efficiency in a silver plant, it is necessary to economize on materials, time and labor by the use of every kind of chemical or mechanical shortcut.

Sodium in Zinc

Q.—On page 97 of the March, 1926, issue of the METAL INDUSTRY, we notice a report of the paper read before the annual meeting of the Institute of Metals Divisions entitled "Modification and Properties of Sand Cast Aluminum Silicon Alloy." This paper contains reference to the use of metallic sodium as a modifier by which we presume a flux is meant in the pouring of these aluminum silicon castings.

We are manufacturers, among other things, of galvanized materials, and the problem has presented itself to us on former occasions of the possibility of incorporating metallic sodium with the galvanizing baths in order to increase the fluidity, without recourse to the common method of raising the temperature of the bath. This idea was enhanced by our discovery that one of the alloy metals sold for the purpse of increasing the lustre of galvanized articles contained a small percentage of metallic sodium. We would be very much interested to hear if you have had any information on the possibility of increasing the fluidity of such metals as zinc by the addition of a small amount of sodium.

A.—Several years ago we tried the preparation of zinc-sodium alloys of rather high sodium content as a possible means of introducing sodium into the aluminum-silicon alloys. The sodium seemed to make the zinc much more sluggish, but this does not mean that it would not be possible to make zinc more fluid by the addition of smaller quantities of sodium. The method described in the paper for the introduction of sodium into aluminum should be suitable for its introduction into zinc.—R. S. ARCHER.

The Copper-Rich Aluminum-Copper-Tin Alloys

In this paper the effect of tin up to 9 per cent by weight on the structure of the yellow aluminium-copper alloys is discussed. A remarkable feature of these ternary alloys is the manner in which the two binary systems merge into each other; there is no abrupt change in a series of solid solutions and the difference between the structure of a β-bronze and a β-aluminium-copper solid solution, for example, is small.

In a certain small number of these alloys the eutectoid transformation does not take place, but near 600° C. the ordinary β-solid solution changes over to a second solid solution indistinguishable microscopically from the first. A proportion of the solid solution poor in copper may dissolve in this new constituent, and, on further cooling, the copper-rich α-phase separates out, but the mother constituent persists down to the ordinary temperature. It is for this reason and also because tin has a retarding influence on the ordinary eutectoid transformation in the aluminium-copper alloys that there are grounds for hoping that a ternary alloy for practical use may be found.—D. STOCKDALE.*

*Abstract of a paper read before the meeting of the British Institute of Metals, March 10-11, 1926.

Brazing Band Saws

Q. Will very much appreciate any information you can give me relative to the elimination of the hardness created in band saws after brazing. I use what I think is the correct method; the regular clamp, Prestolite head and ordinary pliers; silver solder in ribbon form and borax. My saws stand up pretty well at times but all of them are extremely hard for 2 or 3 inches from the joint. They are so hard that a file will not touch them. Can you tell me how to avoid this or how to get rid of the hardness after the braze is made?

A. Your method is correct all the way through with the exception of the way you apply the heat. You should have a pair of brazing tongs for the purpose of heating the joint. The flame applied to the thin steel overheats it and it becomes chilled immediately upon the removal of the flame. Too much heat will ruin the steel leaving an oxidized joint that is sure to be brittle and break. Use the brazing tongs heated to a good bright red. There is no influx of air to the joint; you will get a perfect weld that will hold and the steel will not be injured.—W. L. ABATE.

Testing Materials Society Meeting

Sessions on Metals at the Annual Meeting in Atlantic City, N. J., June 21-25, 1926

The twenty-ninth annual meeting of the American Society for Testing Materials was held in Atlantic City, N. J., June 21-25, at the Chalfonte-Haddon Hall.

NEW OFFICERS

The new officers of the society, whose election was formally announced are:

President—J. H. Gibboney, chief chemist Norfolk & Western Railway Company, Roanoke, Va.

Vice-President—G. W. Thompson, chief chemist National Lead Company, 105 York Street, Brooklyn.

Members of the executive committee—Cloyd M. Chapman, consulting engineer, 105 West Fortieth Street, New York; W. F. Edwards, director of research United States Testing Company, Inc., 316 Hudson Street, New York; W. B. Price, chief chemist and metallurgist Scovill Manufacturing Company, Waterbury, Conn., and H. T. Shelley, secretary and manager Eastern Clay Products Association, 906 Colonial Trust Building, Philadelphia.

Below are abstracts of the papers on metals:

CORROSION AND FATIGUE OF METALS

Report of Committee A-5: On Corrosion of Iron and Steel. J. H. Gibboney, Chairman.

Reports were presented on inspection of copper-bearing and non-copper-bearing sheets exposed to the atmosphere and to total immersion; also results obtained in accelerated (short-time) tests on sheets coated by several zinc coating processes and by lead spraying. Progress made on an extensive program of exposure tests of zinc-coated materials; new tentative specifications for the coating on zinc-coated wire, for galvanized telephone and telegraph line wire, and for galvanized tie wires.

Report of Committee D-14: On Screen Wire Cloth. R. W. Woodward, Chairman.

Results were given of exposure tests of non-ferrous screen-wire cloth at various locations; also a paper as an appendix giving results of laboratory tests on the screen wire cloth.

Report of Committee B-3: On Corrosion of Non-Ferrous Metals and Alloys. E. C. Lathrop, Chairman.

A general report of progress giving an itemized statement of the number of tests conducted and of the work carried out by the various laboratories co-operating in the committee's test program. Work is being done in compiling a list of non-ferrous metals and the importance of each metal for each type of corrosion service.

Recent Developments in the Use and Fabrication of Corrosion-Resistant Alloys. T. H. Nelson.

The paper discussed particularly stainless iron and steel, their methods of fabrication and the advantages of certain varieties of corrosion-resistant alloys for specific purposes.

Microstructure of Zinc Coatings. W. H. Finkeldey.

Stress-Cycle and Deflection-Cycle Endurance Graphs, and Corrosion-Fatigue of Metals. D. J. McAdam, Jr.

Discussed the form of the pure stress-cycle endurance graph as affected by chemical composition, heat-treatment and cold working, cycle frequency, form of specimen and thermal conductivity, the effects of these variables singly and in combination being illustrated. By the information thus presented it should be possible to avoid unnecessarily long endurance tests such as the tests now being made by several investigators. The corrosion fatigue of metals is also discussed.

Effect of Grooves and Threads on the Fatigue of Metals. R. R. Moore.

Test results showing the effect of various shapes and sizes of notches upon the endurance limit of a heat-treated chrome vanadium steel and an aluminum-copper alloy. Static tension test results are compared with the dynamic endurance test results to show the difference between the relative effects of the notches under static and dynamic stresses. Test results include some long-time endurance runs on the aluminum-copper 25S.

Fatigue of Metals by Direct Stress. P. L. Irwin.

Contained chemical analysis, heat treatment, tension test data, endurance limit under flexural stress, and endurance limit under axial stress, for electrolytic annealed copper, pure nickel, monel metal and stainless iron. The paper dealt with metals whose proportional limit in tension is below the endurance limit whereas a similar paper by the author last year dealt with metals whose proportioning limit in tension is above the endurance limit.

NON-FERROUS METALS AND METALLOGRAPHY

Report of Committee B-1: On Copper Wire. J. A. Capp, Chairman.

Submitted revisions of the standard specifications for hard-drawn, for medium hard-drawn, and for soft or annealed copper wire, for bare concentric-lay copper cable: hard, medium-hard or soft and for round and grooved hard-drawn copper trolley wire. Recommended that the specifications for hot-rolled copper rods for wire drawing be advanced to standard. Recommends that the specifications for bronze trolley wire and for soft rectangular copper wire be revised and continued as tentative.

Report of Committee B-4: On Metallic Materials for Electrical Heating. Dean Harvey, Chairman.

Presented new tentative method of test for resistivity of metallic materials for electrical heating.

Report of Committee B-2: On Non-Ferrous Metals and Alloys. William Campbell, Chairman.

Presented new tentative specifications for aluminum-bronze castings; for the alloy: copper 88 per cent, tin 8 per cent, zinc 4 per cent; for steam or valve bronze: for composition brass or ounce metal and for aluminum base sand-casting alloy ingots. Recommended revisions of the methods of chemical analysis of brass ingots and sand castings, and of bronze bearing metal. Recommended that the tentative methods of chemical analysis of aluminum and light aluminum alloys; specifications for aluminum ingots for remelting, for aluminum sheet and for aluminum base alloy sand castings be revised and continued as tentative. Recommended the advancement to standard of the tentative specifications for white metal bearing alloys and for aluminum for use in the manufacture of iron and steel. Presented papers on the fluidity of white metals and the properties of high-strength aluminum alloy castings.

Some Mechanical Properties of Duraluminum Sheet as Affected by Heat Treatment. R. J. Anderson.

Described the effects of various annealing, quenching, and aging treatments on the tensile properties (elastic limit, tensile strength, elongation, and reduction in area), indentation (cupping) properties, and hardness of duraluminum sheet of six different gages. Heat treatments designed to give maximum strength and hardness, as well as minimum strength and greatest softness, were described.

Aluminum Casting Alloys: The British Engineering Standards Association Specifications Reviewed. George Mortimer.

Reviewed methods specified for checking the quality of the aluminum casting alloys covered by the British Engineering Standards and compared them with current methods in America. In few cases in routine work can any test bar represent the strength of a casting. It was shown that both a sand-cast coupon integral with the casting, and the B. E. S. A. chill-cast separate bar as at present specified, involve too many variable factors to give a reliable indication of the quality of the melt.

One method was described which eliminates variables of practical import in connection with a chill-cast bar.

Etching Characteristics of the Constituents in Aluminum Alloys. E. H. Dix, Jr., and W. D. Keith.

Etching reagents and technique of etching were described together with the etching characteristics of the constituents found in the binary alloys prepared from aluminum of exceedingly high purity.

What Brass Men Talk About

Rolling Mill Questions That Are Not Yet Settled

Written for the Metal Industry by WILLIAM J. PETTIS, Rolling Mill Editor

When a group of rolling mill men get together, the natural topic of conversation is, of course, their particular line of work; the personal grief it brings in its accomplishment; how the industry could, and should be improved; what the consumer does not know about the brass he buys, or what physical characteristics it should have to meet the demands he puts on it and remedies for all the various troubles.

These discussions are interesting and instructive, and have no little value in stimulating ideas. In fact they deserve a wider field for discussion than is afforded by the chance gathering of men from different mills. It is with the view of inviting such discussions, and furnishing a broader field, through the medium of The Metal Industry that I am listing a few of the subjects of many of these meetings.

Mill foremen, rollers and casting shop operators, all have ideas on which they would like to have the other fellows' viewpoint. The following are a few of the items discussed which I draw from memory, with no attempt to classify them.

Basic changes in the art.—In the art of producing rolled brass, sheets, strips, etc., the general opinion is, that there has not been any real change; only refinement of long-existing methods.

Overhauling brass.—The claim is made that the English brass manufacturer exercises great care in the casting shop, treatment of the molds, and in all the details that go with casting the brass; the surface of the castings produced are clean and smooth and that the overhauling operation is not necessary. This is a big item.

Reducing the scrap loss in the rolling mill.—By making better castings with a surface that does not require overhauling, or so nearly free from defects, as to require a very light over-hauling; a compromise between the English and American methods.

Making the castings in heavier units.—With mechanical equipment for handling the coils, throughout the different operations there is no reason why a 500 lb. casting could not be handled successfully. There would result a reduction in the scrap loss, and an increase in production, and meet the consumers' demand for long coils. The real problem, however, would be in the casting shop.

Annealing.—To control "grain growth" in the annealed brass so that the formation that will admit of the greatest reduction in the rolling process can be determined and maintained. It would be economy to anneal the breaking down bars in smaller lots. The present practice leaves the annealed load of breaking down bars with a range of three degrees of hardness—hard, medium and soft. The medium bars represent the greater part of the load, and in rolling, the amount of "pinch" is based on what they will stand. The hard bars often split in rolling. The soft bars will stand a larger percent of reduction, owing to the fact that their position on the pan, in combination with their position in the muffle created conditions that gave these bars the ideal heat treatment. It created a grain structure that increased the ductile qualities to the maximum. The condition of heat treatment should be under control so that every bar annealed would stand the maximum reduction in rolling, eliminate any loss through split bars, reduce the number of annealings necessary under the present method, and increase products of the rolls.

Tandem Rolls in the Brass Mill.—This idea receives little support, and few of the larger mills have adopted them, though it is admitted that where large amounts of standard sizes are handled, it might be of advantage. But the line of commercial work most mills handle varies so much in width, temper, etc., as to make the tandem rolls of doubtful advantage.

In the steel mills, rolling cold roll steel strip, where the sizes are more standardized than in the brass business, tandem rolls have found a place. One steel mill man states their output as follows: four passes finish a large percentage of steel strip requirements. The tandem mills are hooked up in fours. One set of four tandem mills will produce twice the product that four single mills will produce, with 40 percent less labor, and it takes about 45 minutes to make a change. Unfortunately that is not brass.

Roll grinding or the art of properly shaping a roll to meet certain conditions.—The subject is a big one, and ranges from methods that will shape up a roll most quickly to the highest surface polish on roll, the part diameter, length of roll, strength of the housing, play in determining shape of roll, to handle wide metal, and a multitude of other points. Most rollers have their own methods, but as they all do good work the difference is in theory rather than fact.

I conclude with the statement the bond houses append to the issues they offer to the public. "We do not guarantee the statements and figures contained herein but they are taken from sources which we believe reliable."

The Value of a Business Publication

Relation of a Business Publication to Its Trade, and the Technical Societies and Trade Associations. A Paper Read Before the Convention of the American Electro-Platers' Society in Newark, N. J., June 29, 1926

By ADOLPH BREGMAN, Managing Editor, The Metal Industry

The last few years have seen an extraordinary rise in the number and influence of technical and trade publications, or as they are now known. industrial or business publications. It seems fitting, therefore, at this time, to explain the work of such a publication in the electro-plating and finishing trades.

Every publication has two departments upon which it is based.

1. The Editorial Department which is responsible to the reader.

2. The Advertising Department which is responsible to those who wish to sell materials, equipment, supplies, etc., to the reader.

The Editorial Department has for its object, the presentation of technical and trade information which will be of concrete value. The reader must be supplied with material which will not only interest him, but which will be worth his while. Trade publications are read to a surprising extent during business hours. It is a part of every man's business to keep in touch with new developments in the art in which he is engaged, and to know what changes or improvements are being made. There is no time more profitably spent than the hour or two in looking over the publication which deals with his industry. Therefore, such a publication must appeal to its reader primarily from the dollars and cents point of view. It must pay him to read it.

Good publications have little or no difficulty in providing their readers with information far beyond the value of the subscription price, as said subscription price is almost always ridiculously low, and does not nearly pay for the cost of producing the magazine.

In a general way, information of interest to a trade such as electro-plating can be grouped under the following heads:

Descriptions of new and modern plants.

Descriptions of new chemical and electrical methods, including formulae, etc.

Descriptions of operating methods, such as plant layout, placing of equipment, production statistics, cost-keeping, etc.

Editorial opinions based on wide acquaintance with the trade and numerous sources of information.

Abstracts and announcements of publications of interest to the trade other than those published in the journal. These would include new books, publications of technical societies, etc.

Answers to shop problems and technical inquiries.

Announcements of patents issued, of interest to the trade.

Descriptions of new devices, machinery, supplies, and other items used in the trade.

News of the associations and societies in the trade. This is a very important function as the journal can greatly aid the growth and influence of technical societies and trade associations by giving them publicity in the news columns and reprinting their articles and papers in the technical columns.

Personal reports of the activities of various individuals known in the trade.

Reports of deaths of prominent persons.

Business reports from various localities, giving conditions in the industry, new corporations, etc., thus often providing readers and advertisers with important information about those who are engaged in their industries.

Prices of materials and supplies.

The business or bread and butter side of a publication is its advertisement department. It is here that those firms and individuals manufacturing materials, which the readers use, can describe their products in their own terms.

This does not mean, however, that the reader has no interest in this department. As a matter of fact, the reader who treats advertising pages as if they were unwelcome salesmen, is making a serious mistake. He should look upon these pages as an important source of information. Statements made in the advertising pages are, of course, made by the advertisers themselves, and may be open to the charge of bias. No publication of standing, however, will permit anything to appear in these pages which will not conform to a very high standard of competition. For example, it is perfectly proper for an advertiser to praise his own products, but he must not depreciate those of his competitor. Moreover, an advertiser must not make extravagant claims, or claims that he cannot fulfill. Not only is this practice unethical, but it is an evidence of poor judgment, as this deception is certain to be discovered and will re-act all the more strongly against one who has practiced it.

Obviously, therefore, no advertiser can buy reading space or influence the policy of the editorial department because of his advertising expenditures. It would be ruinous both to the journal and to the advertiser if such a practice were permitted, as the reader would lose confidence in the journal and stop reading it.

The best summary of the function of a business publication was made by the Editorial Conference of the New York Business Publishers' Association, Inc., several years ago, and we can think of no better statement of our beliefs than the following:

1. To consider first the interest of the subscriber.

2. To publish in an impartial way, free from personal opinion, the news of the industry in which the paper circulates.

3. To refuse to publish "puffs," free reading notices or paid "write-ups," and to keep his reading columns independent of advertising considerations.

4. To be a leader of thought in his editorial columns and to make his criticisms constructive, with the object of bringing his industry to higher levels of thought and practice and to a greater measure of public service.

5. To support in his columns such worthy measures of public interest as their importance justifies and the space available permits.

6. To give proper credit for articles taken from other publications, and to avoid unfair practices in competition with them.

THE METAL INDUSTRY

With Which Are Incorporated

THE ALUMINUM WORLD, COPPER and BRASS, THE BRASS FOUNDER and FINISHER
THE ELECTRO-PLATERS' REVIEW

Member of Audit Bureau of Circulations and The Associated Business Papers

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EDITORIAL

THE ELECTRO-PLATERS' CONVENTION

The fourteenth annual convention of the American Electro-Platers' Society, the most successful convention ever held, included several outstanding features. The technical sessions were remarkable for the number and high standard of papers presented. Dr. Blum gave a most interesting survey of the progress of the electro-deposition work at the Bureau of Standards, explaining the work done on chromium plating, zinc sulphate solutions, nickel solutions, etc. The papers of note were so numerous as to make it impossible to mention them all here.

There never was a better planned and executed convention. Entertainments and plant visits were carried through like clock-work with a minimum of delay and wasted time. The type of plants chosen to visit were most suitable and of the greatest interest to the assembled delegates. The Raritan Copper Works, described in our June issue, showed them electro-deposition on an enormous scale; the Hanson and Van Winkle Company, and A. P. Munning and Company showed them how products were made which they used in their daily operations. Other interesting plants were visited and the convention was concluded by the usual sports and banquet.

The Society took a long step forward in passing the regulation to permit the publication of papers immediately after being read. We congratulate the Society on this progressive act and repeat what we have stated so many times in the past, that it will result in greatly increased prestige.

The research fund shows satisfactory progress, now totalling $3,050. In the membership drive, Chicago Branch took first place. Honorable mention was given to St. Louis, New York, Philadelphia and Bridgeport. We wish that the Society had seen fit to admit assistant foremen platers to some form of membership, but this will undoubtedly come at a later date.

The prizes for the best papers published during the year in the Monthly Review were awarded, with the approval of all, to Messrs. Sizelove, Lovering and Barrows, in the order named. Mr. Sizelove's paper on Approved Methods of Analyzing Plating Solutions is being reprinted at the present time in THE METAL INDUSTRY.

The meeting was in many ways a re-union of pioneers in the formation of the American Electro-Platers' Society. Many of the old charter members were present, and one can easily imagine their emotions upon attending a convention of well over 400 in registration with almost 1,000 at the banquet, and comparing it with the first gathering of the Society. The early struggles are over, but of course, there are problems still to be solved. There will always be problems, but they will be questions of growth and extended influence, not life or death, as in the old days.

The Society is growing stronger year by year and it is growing more progressive. The combination of these two is unbeatable.

THE SUPPLY SALESMAN

The growth of the International Fellowship Club, an organization of electro-plating supply salesmen founded by Wilfred S. McKeown, is one of the most encouraging features of this industry. In the old days a salesman of supplies was first a salesman, a "go-getter." His business was to sell materials—regardless—and nothing else was considered. He sold by means of his persuasive tongue, his persistence, low price or any other means at his command.

But times have changed. Now a salesman of technical materials and equipment must be more than a salesman. The purchaser demands of him a knowledge of those materials. He must tell what is in them, he must know how to apply them and be able to manipulate them in case of trouble. The salesman is now, therefore, an adviser and a "trouble-man."

The first pre-requisite of a salesman's product is quality. Price, of course, is an important factor, but not so important as it used to be. His materials must do the work. With the increasing complexity of plating and chemical operations, each item has its field and there is no one best for all purposes. It is impossible for every shop to hire a consultant to solve its difficulties. It is dependent upon its own operating forces and the advice from the people who supply it with equipment and materials.

More and more the company is judged by the quality of its salesmen; their knowledge of the customer's business and their willingness to help him solve his problems. For that reason a salesmen of plating or foundry supplies is in most cases, a plater or foundryman and in a growing number, a metallurgist or engineer.

"Service" is a much over-discussed and excessively used word, but there is nothing which better explains the function of the modern supply salesman. Quality of product and the service behind it are what he is selling to a great extent. The price is judged more and more, not per pound or per piece charged, but per pound or per piece of product resulting from the use of his materials.

We hope to see more organizations, in other lines, like the International Fellowship Club come into being.

LIQUIDATING A BRASS MILL

During the last month the existence ended of one of the large brass manufacturing plants of the United States and the largest that was ever carried on in New York City. The Manhattan Brass Company equipment was sold at auction.

The passing of a plant employing 450 men is no small matter in the trade. It means a scattering of a large volume of business throughout the country and the re-distribution of its employees. Whether or not this can be called "progress" is debatable, but there is no gainsaying the power of rising land values. Between this factor and the pertinent fact that a plant employing 450 men was operating equipment 50 years old, carried at a book value of only $65,000, it is obvious that the business had small chance to live much longer.

This condition was perhaps foreseen by the management many years ago, and it may have been deemed wiser to conserve cash, as far as possible, than to invest it in expensive equipment which would be later overrun by the march of real estate values.

All of which confirms the generally growing opinion that the large manufacturing plant has no place in the midst of a metropolitan center. Cities are growing to be more and more commercial centers with manufacturing operations carried on in the outskirts.

EVERLASTING PLUMBING

A newspaper report announces that the pipes and fittings of the new cathedral of St. John, the Divine, are being installed with the aim of having them last for centuries without a leak. The architects state that this entire installation has been approached with a view to permanency beyond anything yet considered in similar construction lines.

Fibre ducts are used for electric wire, these ducts terminating in extra heavy cast brass outlet boxes. They are made of extraordinary size to permit additional wiring to be installed in case, in later years, electric heating equipment will be used.

Pipes for carrying off rain water will be brought down inside the heavy walls to avoid danger from freezing, and a melting device will be built at the gutter opening so that live steam can be turned on to avoid clogging of the drain pipes. The leader pipes will be 6 inches in diameter and of extra heavy copper ⅓ inch thick, with fittings of heavy cast brass.

It is stated also that copper and brass were considered for steam piping but were discarded in favor of wrought iron because of the considerable expansion which piping must stand. Moreover, in order to avoid fittings it was decided to weld all of the joints, as according to the statement welded copper is weak at the edges.

This is the first time that we have had brought to our attention, the weakness of welded copper and brass.

What have the exponents of copper and brass piping to say about this decision?

TECHNICAL PAPERS

A List of the Bulletins, Journal Contributions and Patents. By Members of Mellon Institute of Industrial Research During the Calendar Year 1925. Bibliographic Series, Fourth Supplement to Bulletin No. 1. Mellon Institute of Industrial Research of the University of Pittsburgh, Pittsburgh, Pa.

Research Associates at the Bureau of Standards. Circular No. 296, Department of Commerce, Bureau of Standards, Washington, D. C. This circular gives a brief story of the origin and present status of the research associate plan which has recently grown notably both in magnitude and variety of fields. Examples are given of actual cases with a brief account of the research problems. Some published results are listed by title and citation to place of publication. A list of associates with the names of sustaining organizations and the problems under investigation is given. The actions of Congress which authorized the opening of the Bureau's facilities for study and research are quoted in full. Research in progress ranges from fundamental science to the most practical applications in industry.

Relations Between the Temperatures, Pressures, and Densities of Gases. Circular No. 279. Department of Commerce, Bureau of Standards, Washington, D. C. The attempt has been made, in discussing the relations between the temperatures, pressures, volumes and weights of gases, to derive the formulae in a simple manner with the minimum requirements of theoretical knowledge on the part of the reader. The experimental data involving high pressures are presented in such a form that problems of this nature can be easily solved by introducing factors taken directly from curves. Comparisons of the calculated values with the experimental data for various gases are shown by means of a series of curves. There is included a rather extensive bibliography of the literature pertaining to the subjects herein discussed, together with a number of tables of conversion factors and equivalents.

GOVERNMENT PUBLICATIONS

Cut Tacks and Small Cut Nails. Simplified Practice. U. S. Department of Commerce, Washington, D. C.

Sheet Steel. Simplified Practice. U. S. Department of Commerce, Washington, D. C.

Sidewalk, Floor and Roof Lights. Simplified Practice. U. S. Department of Commerce, Washington, D. C.

Coke and By-Products in 1923. By F. G. Tryon and H. L. Bennit. U. S. Geological Survey, Washington, D. C.

Rare Metals in 1924. By Frank L. Hess. Bureau of Mines, Washington, D. C.

Copper in 1924. (General Report). By Helena M. Meyer. Bureau of Mines, Washington, D. C.

Fuel Briquets in 1925. By James E. Black. Bureau of Mines, Washington, D. C.

NEW BOOKS

How to Buy Fuel Oil. By Steven O. Andros. Published by the Haupt Publishing House. Size 5 in. x 7½ in. 127 pages; illustrated. Price, payable in advance, $2.00. For sale by THE METAL INDUSTRY.

This book on fuel oil is intended especially for purchasing agents. It is written in a "free and easy" style to make it readable. The author has inserted the free and easy portions with the idea that without them the book would not be read. This is hardly complimentary to purchasing agents.

Aside from the "humorous" portions which are obviously dragged in by the heels, the book contains considerable information on fuel oil, its methods of testing and uses. Chapters of greatest practical importance are as follows: Properties of Fuel Oil; What Gravity to Buy; Pre-Heating and Storage; How to Burn Oil; Government Specifications and Tests.

SHOP PROBLEMS

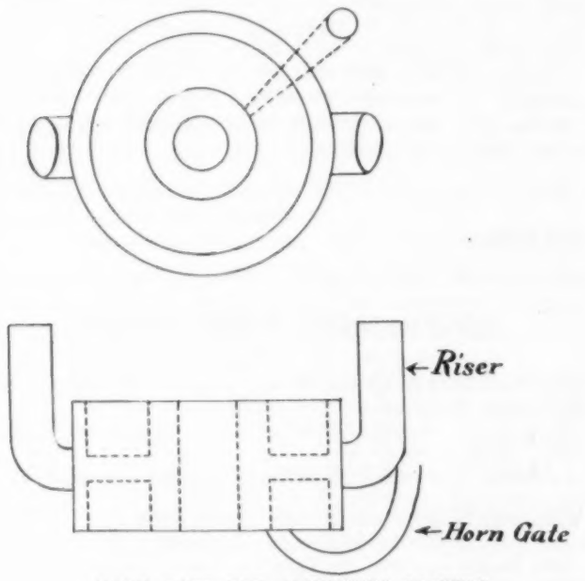
IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE

ALUMINUM CASTING

Q.—We are making an aluminum casting which must be machined both on the inside and all over the outside. We have had trouble with the rim being dirty. Metal is not overheated, being tested by a pyrometer before pouring. Temperature is kept not over 1250° F. Casting weight, 5 pounds. We are wondering if our trouble is in the gating, as casting seems to be clean otherwise, and nice and solid.

If our gating is wrong, would you suggest the proper way to gate same to overcome our difficulty. Metal used is a No. 12 alloy mixed from Virgin metals.

A.—We do not see where you should have any trouble with such a casting, as you say your metal is not overheated and poured at 1250 degrees, which is correct temperature. We suggest, however, to overcome this difficulty, that you gate with a horn gate, like sketch, and use about 3 per cent silicon in your aluminum, taking out the aluminum so that your mixture would be 89 aluminum, 8 copper, 3 silicon.



HORN GATE FOR ALUMINUM CASTING

The silicon is best introduced by purchasing the ingot of 50 aluminum and 50 silicon, and adding 6 lbs. per hundred, and we feel you will eliminate your trouble.—W. J. R. Problem 3,541.

BRIGHT NICKEL

Q.—I understand that some platers are getting very good results by using a solution of glycerin in their nickel bath in plating the castings to give them a bright deposit and save the expense in nickel color buffing them after plating, I would be pleased to get some information on this subject as to the amount used per gallon and just how it is used, etc.

I would also like to try out using cadmium as a brightener in my nickel solution. However, I want to use it in powder form instead of cadmium sticks.

I believe in order to get a nice bright nickel deposit on die castings without buffing, it would be necessary to have the cathode rod agitated; also the solution should be constantly filtered with some sort of a filter pump.

A.—Although glycerin has been used for many years as a brightening agent for nickel deposits and about two years ago was patented in connection with lead acetate as a brightening agent, it has never proved to be an effective agent. Cadmium is used universally either in the form of metal sticks or converted into a chloride by dissolving in hydrochloric acid. The cadmium metal sticks are used in mechanical barrel plating solutions or in mechanical conveyor solutions. The constant agitation of the solutions under such conditions results in a perfect diffusion of the cadmium metal reduced from the cadmium anode. Such solutions, however, should be maintained with slightly more free acid than a normal non-bright nickel solution.

Hydrochloric acid is the most satisfactory acid to use, preferably in amounts from 1/32 to ⅛ oz. per gallon of nickel solution. In usual still plating nickel solutions cadmium metal anodes should not be used owing to the danger of reducing too much cadmium in the near vicinity of the cathode or articles being plated, resulting in a cadmium smut which is dark and smoky. The reason for this condition in a still solution is that the cadmium does not become thoroughly diffused in the still solution as in the mechanical solution.

Cadmium chloride (commercial salts) can be used in amounts of half to one oz. per 100 gallons of nickel solution. The salt should first be dissolved in hot water, 160-180 deg. F., and thoroughly mixed in the nickel solution. It is best to make the addition at the close of the day's work so that the solution can be thoroughly stirred then allowed to settle down. Platers as a rule prepare their own cadmium chloride by dissolving the cadmium metal in hydrochloric acid to produce a saturated solution. So prepared, it is used in place of cadmium chloride and costs much less, based upon the percentage of metal the solution contains.

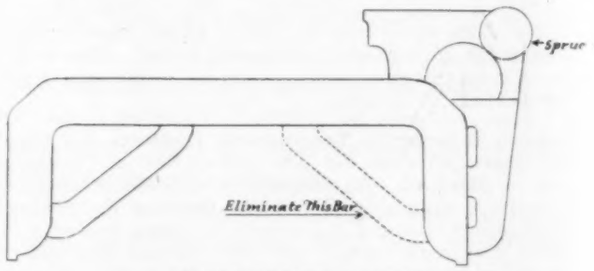
Die castings are plated more uniformly when the cathode rods are mechanically moved either horizontally or vertically or continuously as in a moving cathode solution. Filtration is an advantage because it removes all sediment from the solution and eliminates hydrogen to some extent.

Glycerin can be tried out on the basis of ⅛ to ¼ oz. per gallon. Use ⅛ oz. 75 per cent acetic acid per gallon of nickel solution mixed with ⅛ oz. glycerin in ½ to 1 oz. of water per gallon of nickel solution.—C. H. P. Problem 3,542.

BRONZE CASTING

Q.—We make castings like enclosed sample. Our bronze alloy consists of 16⅛ parts copper and 1 part tin. We find that the castings break easily. Do you know of any way to eliminate this?

A.—After examining the sample casting, we are of the opinion that your trouble is in your gating, and we suggest that you eliminate the gate near the sprue on the inside as you can readily



GATING BRONZE CASTING

see that the casting must shrink. This, being near the hot metal, will not let the casting shrink; hence the crack. We feel sure if you remove this gate, you will not have any further trouble. Below is a sketch showing the gate we suggest that you remove. —W. J. R. Problem 3,543.

CHANDELIER MIXTURE

Q.—Will you kindly give us a formula for a metal mixture which will be suitable for a good dark color for bronze chandelier work?

A.—A very good mixture suitable for chandelier work, one that will run well, and sharp and clean, is 87 copper, 8 zinc, 3 tin, and 2 lead. The coloring of the bronze is done by the buffer and plater. If you give the plater a good clean solid casting, he can produce the color you desire.—W. J. R. Problem 3,544.

CLEANING ALUMINUM

Q.—Would you advise, what is the proper solution to use to clean aluminum; also if it turns black? How can the brightness be restored, by dipping process?

A.—The methods used in producing a white satin finish on aluminum articles are as follows:

1. The excessive grease should be removed first by washing the articles in gasoline or benzine. They should then be dried out in hardwood sawdust.

2. Following the preliminary cleansing, immerse the articles in hot alkaline cleansing solution for a few moments. Any of the commercial cleaners advertised in THE METAL INDUSTRY will answer the purpose. Use about 4 oz. per gallon of water at a temperature of 200° F.

3. Wash the articles thoroughly, following the alkaline cleaning in cold water; drain thoroughly, then immerse in the following acid dip for a moment to reduce the oxide, resulting from immersion in the hot alkaline cleaner. After acid dipping, wash in cold and boiling waters and dry out in hard wood maple sawdust if necessary.

4. Acid Solution: Nitric acid 38°, 2 gallons; sulphuric acid 66° 1 gallon. Use the acid solution at normal temperature; avoid any addition of water to the dip.—C. H. P. Problem 3,545.

GOLD FINISHES

Q.—Can you give me a good reliable formula for a green gold with a smut or antique finish? I need an imitation; also rose gold and plain antique gold; these all to be imitations. This finish is to be used on custom coach work.

A.—You do not state the nature of the base metal to which you desire to apply the imitation green gold antique, green gold and rose gold finishes. Brass or brass plated surfaces would have to be used as a basis for such finishes. For antique green, the following olution can be used:

Water	1 gallon
Hyposulphite of soda	8 oz.
Single nickel salts	4 oz.

Temperature 180° F. Immerse the articles in the solution until they become a dark green, then remove, wash in water and relieve the green from the highlights with pumice stone or powdered silica and water. Finally lacquer with a green tinted lacquer. For rose gold finish, the brass surface should be gold lacquered then a rose should be made up from orange chrome dry color; a little jewelers' gold rouge, mixed with japan dryers and turpentine. The color should be applied to the backgrounds of the articles that have been previously gold lacquered. Then when the rose color is partly dry, wipe off the excess with a cloth.

For antique gold, gold lacquer the brass; then apply a little burnt umber and ochre mixed in a similar manner as for the rose gold, and apply in the same manner. When dry, wipe out the excess color with soft cloths. Tube colors can be used ground in japan instead of dry colors. Masury's japan colors are excellent for the purpose.—C. H. P. Problem 3,546.

SILVER AND NICKEL ON FLATWARE

Q.—I am a beginner in the electroplating line and my knowledge is very limited. I would certainly feel grateful for your assistance in the following:

1. What equipment is necessary to start this business?

2. What in your judgment is the best sized tank for silver or nickel plating?

3. In a three foot tank, how many silver anodes would you advise?

4. What solution of cyanide, chloride and water is advisable in a tank about 24" x 36" long, and how much of each part do you recommend?

5. Being a retailer, I have only resilvering to work on. Is there any book on just what to do, from making solution, rinses, buffing and polishing, etc? This would assist me more perhaps than anything else as I could refer to it at any time.

6. Must a tank be thoroughly cleansed for nickel plating if used for silver plating previously?

7. How many nickel anodes should be used in the above sized tank; can the same connections and same power be used?

8. What is the best solution for nickel plating that is both satisfactory and economical?

9. Has nickel plating on flatware proved as satisfactory and lasting as silver plating?

10. Would you advise as beginner that I purchase used equipment (if reliable), later buying new?

A.—We suggest that you read any of the following books: Electro Deposition of Metals by Langbein; Principles of Electroplating and Electroforming by Blum and Hogerboom; Polishing and Plating of Metals by Hawkins.

No. 1. See above books.

Nos. 2 and 3. Depends upon the size and number of articles to be plated at one time. A 50-gallon solution in silver or nickel would no doubt, answer your purpose.

No. 4. A tank of the dimensions you describe will hold about 70 gallons of solution, either silver or nickel, allowing two inches from top of the tank. The silver solution should be as follows:

Water	1 gallon
Sodium cyanide	95-98 per cent, 4 oz.
Silver cyanide	3 oz.
Carbonate of potash	1 oz.

The nickel solution for your purpose is as follows:

Water	1 gallon
Double nickel salts	8 oz.
Single nickel salts	4 oz.
Common salt	2 oz.
Boracic acid	2 oz.

No. 5 See above books.

No. 6. Tanks if made of wood should be lined with molten asphaltum. A tank used for silver plating if made of wood should be asphaltum lined for nickel solution, otherwise trouble will result in the nickel deposit.

No. 7. Eight nickel anodes 4 x 12 x ½ inches thick; silver anodes 6 anodes same dimension, 1/16 or ⅛ thick.

No. 9. Nickel plating of flat ware is used only on the cheapest product.

No. 10. Good second-hand equipment will answer. New is always more satisfactory.—C. H. P. Problem 3,547.

TERRA COTTA FINISH

Q.—I wish you could give me some information about a tan color finish I am using. The trouble is when the work is finished and lacquered some of it, after a short time, begins to turn black. If I place one piece on top of another with a small piece exposed, the exposed part turns dark, and if I wash off the lacquer it brings back the natural color. What I cannot understand is that it happens only on some of them. First I plate the cold rolled steel in nickel for about 15 minutes, then give a good coat of acid copper, scratch brush, wash off and dip in solution composed of ½ oz. potassium chlorate; 2 oz. copper sulphate; water 1 gallon.

A.—Unfortuntely terra cotta or tan finishes produced by the aid of copper sulphate and potassium chlorate solutions have a tendency to fade when exposed to light. You might try a solution of the following proportions:

Water	1 gallon
Copper sulphate	2 oz.
Single nickel salts	½ oz.

You can increase the proportions as may be desired. To prevent fading by exposed light, use a dark wrapping paper. You should also take up the fading problem with your lacquer manufacturer. Possibly what is required is a high gum content lacquer and low cellulose.—C. H. P. Problem 3,548.

PATENTS

A REVIEW OF CURRENT PATENTS OF INTEREST

1,583,006. May 4, 1926. **Enameling.** Harrie C. Pierce and Chad H. Humphries, Kokomo, Ind., assignors to Udylite Process Company, Kokomo, Ind.

Process of enameling cadmium and zinc surfaces which comprises contacting the same with a solution of an arsenate, applying enamel to the surfaces, and making the enamel.

1,583,549. May 4, 1926. **Method of Treating Aluminum-Silicon Alloys.** Alfred George Cooper Gwyer and Henry Wilfred Lewis Phillips, London, England, assignors to The British Aluminium Company, Limited, London, England.

A method for physically varying the structure of alloys largely predominant in alumnium and containing silicon as the other principal ingredient which consists in the addition to the molten alloy of a peroxide of an alkali metal.

1,583,741. May 4, 1926. **Apparatus for the Eletrodeposition of Metals on Wire and Strip.** Joseph Arthur Parker, Cwmbran, Wales.

An apparatus for the electro-deposition of metals on continuous lengths of material, comprising a tank to contain electrolyte, a pair of drums of non-conductive material spaced apart and around which the material to be treated moves in a coil, one of said drums adapted to be submerged in the electrolyte in the tank with the other above the level of such electrolyte, anodes depending into the tank closely adjacent the stretches of material between said drums, and cathode means bearing against said stretches of wire above the level of the electrolyte in said tank.

1,583,891. May 11, 1926. **Process for the Electrodeposition of Metals.** Charles P. Madsen, New York, N. Y., assignor to Madsenell Corporation, New York, N. Y.

In the process of electrodepositing metals, repeatedly removing the cathode surface from the bath for a period of time sufficient to permit the hydrogen on the deposited metal to be substantially eliminated from each successive layer of the deposited metal, and returning it thereto during deposition.

1,584,072. May 11, 1926. **Casting Metals.** Adolf Beck, Griesheim-on-the-Main, Germany, assignor to Chemische Fabrik Griesheim-Elektron, Griesheim-on-the-Main, Germany.

The method of preventing easily oxidisable metals and alloys from oxidising on being cast in undried moulds, comprising mixing moulding material with a non-metallic substance incapable of reaction with said metal and adapted, when heated by the heat emitted from the cast metal to form on the surface of the casting a layer preventing the casting being spoilt by the access or air and water vapor.

1,584,219. May 11, 1926. **Aluminum Solder.** John De May, Detroit, Mich., assignor to Packard Motor Car Company, Detroit, Mich.

A metal alloy including tin as the predominant metal, the same being in excess of fifty per cent of the alloy, a relatively large percentage of zinc, and substantial amounts of aluminum and antimony.

1,584,352. May 11, 1926. **White Gold.** David Belais, New York, N. Y., assignor to David Belais, Incorporated, a Corporation of Delaware.

As a composition of matter, a white gold alloy composed of a major part of gold, lesser proportions of nickel and zinc, and a very small proportion of manganese.

1,584,688. May 11, 1926. **Magnesium-Aluminum Alloy.** Herman E. Bakken, Niagara Falls, N. Y., assignor to American Magnesium Corporation, Niagara Falls, N. Y.

An alloy, having a specific gravity approximating that of magnesium, comprising a major quantity of magnesium, a minor quantity of aluminum, and a quantity of manganese not widely different from 1 per cent, the quantity of aluminum being in excess of the quantity of manganese.

1,584,706. May 11, 1926. **High Lead-Bronze Alloy and Method of Manufacturing the Same.** William E. Day, Jr., New Brunswick, N. J., assignor to International Motor Company, New York, N. Y.

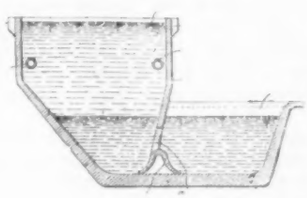
The herein described method of manufacturing a bearing alloy consisting in combining lead and copper and bringing the whole to at least 2700 deg. F., then adding tin and a small quantity of a deoxidizer, pouring the mass into a hot pouring ladle, and introducing the metal into molds.

1,584,835. May 18, 1926. **Means for Holding and Centering Grinding and Polishing Wheels or the Like.** Sven Malcolm Blanch, Worcester, Mass., assignor to Fleming Machine Company, Worcester, Mass.

The combination with a grinding or polishing wheel having a central passage through it larger than the arbor on which it is to be placed, of a pair of sheet metal discs having shoulders fitting the inner wall of said passage and located opposite each other, each of said sheet metal discs having a bearing at the center to fit the arbor on which the wheel is to be applied.

1,584,922. May 18, 1926. **Alloy and Method of Producing the Same.** Joseph Geppert, Chicago, Ill., assignor of one-half to Max Giese, Chicago, Ill.

A new composition of matter, comprising 2 to 16 parts by weight of bismuth, 62 to 72 parts by weight of lead, 16 to 24 parts by weight of antimony, and .5 to 7.5 parts by weight of cadmium.



1,585,308. May 18, 1926. **Tinning Pot.** John J. Markey, Washington, Pa.

A tinning pot made from a substantially U-shaped plate bendable under heat, the plate constituting the bottom and side walls of the pot, and a plate connected to the end edges of the U-shaped member constituting the end members of the pot.

1,585,786. May 25, 1926. **Aluminum Alloy and Method of Manufacture.** Henry Kneeland Richardson, Newark, N. J., assignor to Westinghouse Lamp Company, a corporation of Pennsylvania.

The manufacture of ductile aluminum-zirconium alloys comprising the electrolysis of an unpurified bauxite mixture with zirconium oxide, the proportion of zirconium oxide being insufficient to produce in the finished alloy more that 10 per cent of zirconium.

1,586,035. May 25, 1926. **Electrolytic Precipitation of Copper.** Frederick F. Frick and Carl Eberhard Carstens, Anaconda, Mont., assignors to Anaconda Copper Mining Company, Anaconda, Mont.

In a leaching electrolytic process for the recovery of copper from ores the steps which consist in treating waste solutions containing copper with a basic material capable of precipitating the copper content thereof, leaching the resulting sludge with acid, and recovering the copper content of the resulting solution by electrolysis.

1,586,368. May 25, 1926. **Process of Making Acid-Proof Alloys and Product Thereof.** John P. Kegg, Pittsburgh, Pa.

The process of making alloys that comprises melting copper and lead together, the lead being present in such quantity as tends to segregate from the other constituents, and adding an alkali metal to the melt, thereby holding the lead in suspension therein.

1,587,303. June 1, 1926. **Electrolytic Coating Apparatus.** Austin H. Hart, Montclair, N. J., assignor to Rome Radiation Company, Inc., Rome, N. Y.

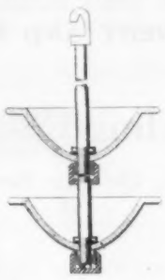
In an electrolytical apparatus for the electro-deposition of a metallic coating comprising a tank containing an electrolytic bath, means for suspending the elements to be coated, in said bath, means for suspending a cathode and an anode therein, adjustable independent means enclosing the peripheries of said elements at a predetermined distance adapted to regulate the deposition of metal upon said peripheries.

1,587,623. June 1, 1926. **Process of Reclaiming the Constituents of Lead Battery Plates.** Max E. Zuckerman, New York.

The process of recovering the material of worn out or scrap lead storage battery plates, which consists in crushing the me-

tallic grid and pasted oxides together and in the presence of a liquid vehicle, discharging said vehicle with plate materials, and separating the same from each other and from the vehicle.

1,587,268. June 1, 1926. **Method of Forming Electroplated Articles and Apparatus Therefore.** Blasius Bart, East Orange, N. J.



In the art of coating a surface of a mold with a layer of metal electrolytically deposited, the method which consists in placing an electric conductor in contact with the mold, exposing said mold and conductor to the electrolyte forming the bath, and stopping off the deposit on the conductor except at the localized area of contact between the mold and conductor.

1,587,992. June 8, 1926. **Composition of Matter for Alloys.** Ray L. Spitzley and Allen M. Thompson, Detroit, Mich., assignors to Alloys Foundry Company, Detroit, Mich.

A non-oxidizing, heat resisting alloy adapted for fusing with cast-in steel parts, comprising nickel 56 per cent, chromium 8 per cent, manganese 7 per cent, iron 26 per cent, silicon 2 per cent, tungsten 1 per cent.

1,587,993. June 8, 1926. **Composition of Matter for Alloys.** Ray L. Spitzley and Allen M. Thompson, Detroit, Mich., assignors to Alloys Foundry Company, Detroit, Mich.

A non-oxidizable alloy comprising nickel 64 per cent, manganese 7 per cent, iron 14 per cent, silicon 2 per cent, tungsten 1 per cent, copper 12 per cent.

1,587,994. June 8, 1926. **Composition of Matter for Alloy of Metals.** Ray L. Spitzley and Allen M. Thompson, Detroit, Mich., assignors to Alloys Foundry Company, Detroit, Mich.

A non-oxidizable alloy adapted for making combination alloy and steel parts, comprising nickel 58 per cent, chromium 8 per cent, manganese 7 per cent, iron 14 per cent, tungsten 1 per cent, and copper 12 per cent.

1,588,468. June 15, 1926. **Process for Producing an Alloy.** Thomas H. Reighard, Tarentum, Pa.

The process of producing a ductile alloy, which comprises melting a supply of copper, in adding thereto a fluxing agent manufactured from furnace slag, in then applying aluminum to said material, in inserting within the aluminum and slag a sparking implement.

1,588,510. June 15, 1926. **Silver-Glass-Mirror Making.** William S. Wear, Excelsior Springs, Mo.

A method of silvering glass consisting in placing the glass to be treated in a substantially horizontal plane, cleaning the surface of the glass, applying a solution of tin chloride to the cleaned surface, washing the surface with hot water to remove excess chloride solution, mixing and applying a solution to the surface thus treated while said surface is wet, said solution having a proportion of 10 ounces of cold water, 4 ounces of hot water, and 4 ounces of a solution formed of 2 ounces of Rochelle salts and 16 ounces of water, mixed with 1 ounce of a solution containing 8 ounces of silver nitrate and 6 ounces of 28 per cent concentrate of ammonia, permitting the solution thus applied to remain on the surface a predetermined length of time, then applying a hot solution containing 1 pint of water, 2 ounces of a solution formed of 16 ounces of distilled water mixed with 2 ounces of Rochelle salts and ¼ ounce of an additional solution formed of 8 ounces of silver nitrate mixed with 6 ounces of 28 per cent concentrate of ammonia, and subsequently cleaning the surface of the glass and permitting the same to dry.

1,588,513. June 15, 1926. **Method of Making Anodes.** Clarence G. Backus, New York, N. Y., assignor to A. P. Munning & Co., New York, N. Y.

The method of making specially shaped anodes of electrolytically deposited metal, which comprises laying out upon a core, conducting areas corresponding in shape to the section of anode desired, subjecting such core to electrolytic treatment to deposit metal upon such conducting areas, removing the built up metal anode units from the core and mounting them upon an anode support.

1,588,518. June 15, 1926. **Alloy of Tantalum.** Porter H. Brace, Pittsburgh, Pa., assignor to Westinghouse Electric & Manufacturing Company, a corporation of Pennsylvania.

An alloy resistant to acids and oxidation comprising 5 to 30 per cent chromium and the remainder tantalum and nickel substantially the proportions of 1 to 75 per cent nickel and 25 to 99 per cent tantalum.

1,589,266. June 15, 1926. **Electric Induction Furnace.** David L. Summey, Waterbury, Conn.

In an electric induction furnace, in combination, a furnace body having a channel for the bath, a primary transformer element, the bath in said channel serving as a secondary and being heated by the currents induced therein, and means for causing the furnace body to rock, at such intervals and in such manner as to stir the bath.

1,589,564. June 22, 1926. **Process of Electrodeposition.** Thomas Robinson, New York, N. Y., assignor to Anaconda Sales Company, New York, N. Y.

A process of electrodeposition which comprises electrolytically applying to the surface of a cathode blank, a thin film of metal, electrodepositing another metal over the film and then stripping off the deposit of the second metal while leaving the film in place on the surface of the blank.

1,589,840. June 22, 1926. **Cleaning Compound.** Anton Cyrczak, Green Bay, Wis.

A cleaning compound formed by mixing the following ingredients in substantially the proportions stated: 5 pints of water, 4 ounces of oxalic acid, 8 drops of trupentine, ¼ ounce of magnesia powder, 1 pint 12 ounces of white vinegar, 1 pint of 20 per cent ammonia.

1,589,841. June 22, 1926. **Process of Coating with Metal.** John A. Daly, New Rochelle, N. Y.

The process of coating an article with metal, which comprises applying a sticky coating to the article, applying a layer of particles in finely divided condition comprising different metals by mechanical means upon said coating, and electroplating said thus treated article to deposit a continuous and impervious coating of metal thereupon.

1,589,988. June 22, 1926. **Chromium Plating.** Kevie Waldemar Schwartz, New York, N. Y., assignor, by mesne assignments, to Chromium Products Corporation, Wilmington, Del.

In the deposition of metallic chromium from aqueous baths of acid nature containing CrO_3 as the predominant acid, the process which comprises electrolyzing with an anode containing metallic chromium.

1,590,034. June 22, 1926. **Metal Coating.** Floyd C. Kelley, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York.

The method of coating cast iron with a non-ferrous metal which comprises heating the cast iron to a temperature sufficiently high to decarburize the surface to be coated, applying cryolite to said surface and bringing copper in a molten state into contact with the cryolite coated surface in a reducing atmosphere.

1,590,091. June 22, 1926. **Silver Alloy.** Friedrich Heusler, Dillenburg, Germany, assignor to the firm of Isabellenhütte Gesellschaft mit beschränkter Haftung, Dillenburg, Germany.

An alloy for the manufacture of coin silver prepared from the following materials in substantially the proportions specified: silver, 80 per cent; aluminum, 9 per cent, and manganese, 11 per cent.

1,590,092. June 22, 1926. **Brass Alloy.** Friedrich Heusler, Dillenburg, Germany, assignor to the firm of Isabellenhütte Gesellschaft mit beschränkter Haftung, Dillenburg, Germany.

An alloy in the physical form of a homogeneous mass prepared from the following materials in substantially the maximum relative proportions specified: copper, 37 per cent; silicon, 13 per cent; iron, 20 per cent, and manganese, 30 per cent.

1,590,101. June 22, 1926. **Process of Coating Iron and Iron Alloys with Chromium.** Spiro Kyropoulos, Gottingen, Germany.

The process of coating iron containing bodies with chromium comprising producing a superficial zone of iron with a small percentage of carbon on the body to be coated, coating the body with chromium and tempering the coated body.

1,590,170. June 22, 1926. **Process of Plating with Chromium.** John Merle Hosdowich, Jersey City, N. J., assignor to Chromium Products Corporation, Wilmington, Del.

In the production of chromium plating baths of better throwing power, the process which comprises adding a small proportion of a soluble salt of a metal more negative than chromium in the electrochemical series to a chromium plating bath containing chromium in two stages of oxidation.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

Porcelain Enameling Furnaces

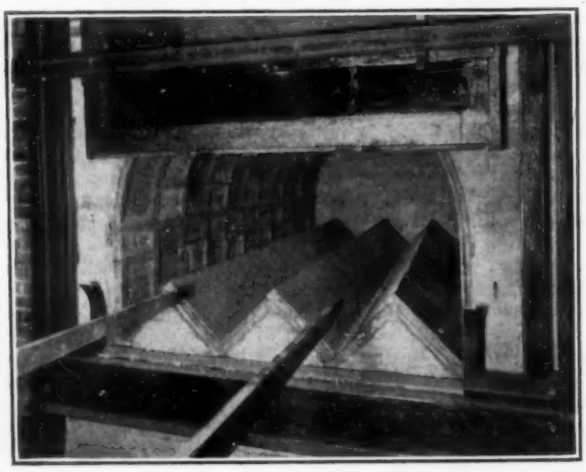
Written for The Metal Industry by R. A. WEAVER, President, The Ferro Enamel Supply Company, Cleveland, Ohio.

At the base of an enamelling furnace is a concrete foundation, approximately eighteen inches thick. Then come four or five courses of cull brick, on top of which are four courses of fire brick. This brings the furnace up to the bottom of the combustion chamber. The outside of the furnace is ordinarily built up of nine inches of red brick.

In the furnaces made by the Ferro Enamel Supply Company, the salt glazed brick, which has many of the good qualities of fire brick, is used for the outside. Inside of these brick are nine inches of Sil-O-Cel insulation, using their standard brick. Inside the insulation they use nine inches of a very good grade of fire brick. Piers, which line the combustion chamber and which support the muffle, must be of very good quality to withstand the action of the oil or gas burner and the great heat at that point. This company has found that Crystolon brick, made by the Norton Company of Worcester, Mass., is the best for their purpose. This is a silicon-carbide product, which does not melt even at a temperature about 4000° F., and has great physical strength, hot or cold.

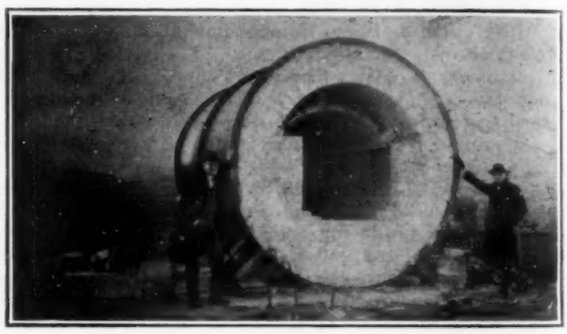
The muffle of an enameling furnace is very much like the oven of a coal cooking range. It is heated from below, the heat passing outside the muffle through flues in the bottom and sides; then, the heat travels to the top and around the sides. The heat is transferred through the muffle to the work which is to be enameled and the work is not subjected to the actual flame or the products of combustion.

Under old conditions the clay muffle was fairly satisfactory because the work was usually projected into the enameling furnace on a two-wheel tilting fork and no great production was required. Under the modern demands for large quantities of porcelain parts,



"V" TYPE ENAMELING FURNACE

however, it was necessary to work out various schemes to increase production. One scheme was to use two forks on a movable carriage so that one fork could be loaded while the work from the other fork was being enameled. Naturally, this resulted in greater heat losses on account of the increased number of cold loads which were being put into the furnace. This meant that the furnace had to be improved in different ways. In the first place, it was necessary that no heat be lost through the walls, so increased insulation was necessary. Next, it was necessary that the heat from the combustion chamber and the flues be transferred to the inside of the muffle as rapidly as possible in order to take care of the cold loads, which were being put in. Clay muffles would not transfer this heat fast enough, so a better refractory had to be found. A few years ago the question seemed to be solved by silicon carbide muffles, but under certain conditions these had a tendency to "grow." At this time the Ferro Enamel Supply Company is using a fused alumina product, made by the Norton Company and called Alundum. This has the increased heat transmission qualities which desired, does not "grow" and will withstand the high temperatures which we used. As a matter of fact, on account of the splendid heat transmitting qualities, it is not necessary to use as high a temperature in the combustion chamber as formerly.



ROUND TYPE ENAMELING FURNACE

One feature in the design of their furnaces is the patented Manion "V" Bottom. In the old days, the enamelers used either the flat bottom or an arched bottom. In order to support their work, they would then build up what were called "pigs" or supports for the cross bars which held the work. In these furnaces the bottom itself is composed of three inverted "V's," which provide about 50% more radiation surface in the bottom than either the flat bottom or the arched bottom. At the same time, the cross bars, which support the enameled parts, are in turn supported directly on the "V" bottom, rather than on extra brick pigs, necessary with the old style. This naturally should reduce fuel consumption.

The brick work is all well supported by substantial steel bucks with proper tie rods at the top and anchor bolts at the bottom. On top of the furnaces is a recuperator, which uses the waste heat from the furnace, to provide heat for dryers or for heating the building. Most of the furnaces are equipped with low pressure oil burners, either indicating or recording pyrometers, heavy, well-insulated door with an electric door lift and also an extra recuperator which preheats the oil for the burners.

The Ferro Enamel Supply Company has also built a continuous rotary furnace, which has been very successful where production is great enough to require this type of furnace. It uses either oil or electricity as fuel.

Another interesting furnace is the standard furnace in a steel tubular jacket. This furnace has a steel jacket instead of the outside section of red brick and has the nine inches of Sil-O-Cel and the nine inches of first grade fire brick. It does not, however, have a muffle, but the heat goes forward under the bottom, then up two flues at the front and back over the top. The top part is built into the fire brick work.

NEW RAPPING DEVICES

The Malleable Iron Fittings Company, Branford, Conn., is putting out two new vibratory devices, namely, a "pot rapper" and a "flask rapper."

The function of the pot rapper is to consolidate malleable

POT RAPPER

castings in the hard state and packing into annealing pots in such a manner that warpage is not likely to occur during the annealing process.

It is obvious that a vibrator of this type has many other uses besides packing of annealing pots. For instance, this tool in smaller sizes is used for packing nails, screws and other articles into kegs or barrels. Also in taking out bright nails from kegs for galvanizing them, it has been difficult to get the same amount back into the keg and a larger keg was used before the application of a vibrator. Now the material is put back into the same container.

The vibrator is also used for operating screens. With the jaw shown and by the use of an adaptor to go with the jaw, the vibrator can be attached to almost any object for vibration purposes.

The flask rapper is a similar tool but more sturdily built for use in shaking out flasks. The early vibrator for this purpose was suspended by chain or cable or in other ways from a bail beam or direct from a crane hook by chain slings. So much of the vibration was absorbed in the cable and chain and in many cases transmitted to the crane itself, that this application was unsatisfactory.

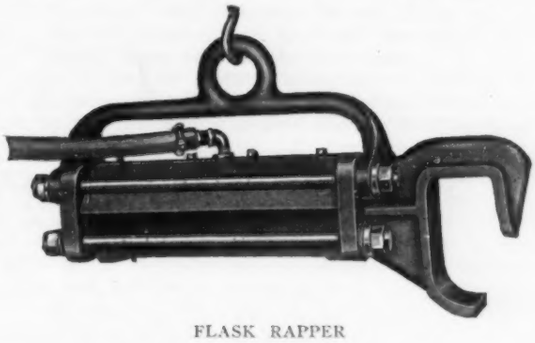
The present type of flask rapper is said to overcome all of these objections. The blow is imparted directly to the flask or object to be vibrated and no vibration is transmitted to the crane or lost in flexible connections such as slings or cables.

These flask rappers as well as the pot rappers or pipe rappers are shipped fully equipped for installation, with starting valves and air line oiling device for proper lubrication of the tools when in operation.

Dry sand flasks as large as 14′ x 16′ x 18″ in depth are shaken out with one 8″ flask rapper. By the use of two 8″ flask rappers working together, dry sand flasks as large as 20′ x 24′ x 24″ deep are shaken out. The shake-out period seldom exceeding 5 minutes.

Hand work on flasks of this size would entail a gang of three to four men working sometimes as much as two to four hours. In many foundries where these are installed the night shake-out crew has ben entirely eliminated. In other cases it has been cut very materially.

The Malleable Iron Fittings Company is distributing a 1926



FLASK RAPPER

catalogue, specification sheets, questionnaire and reprint on the flask rapper; also an instruction book on the use of the flask rapper and pot rapper and a reprint showing the pot rapper in operation.

GRINDERS AND POLISHERS

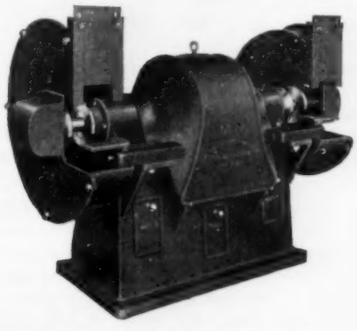
The Safety Emery Wheel Company of Springfield, Ohio, is manufacturing and marketing a line of grinding and polishing equipment which includes two types, portable and stationary.

NO. 4. PORTABLE GRINDER

Three styles of portable grinders are made: the No. 4, No. 5 and No. 18. No. 4 is for use wherever a heavy single frame grinder can be applied. Work formerly done by heavy chipping

NO. 18. PORTABLE GRINDER

on large castings, it is stated, can be done much better and at a great saving by using this machine. In foundry or machine shops where work is too heavy to be moved to the machine, this machine can be quickly and easily taken to the work. The No. 5 portable



NO. 73. FLOOR GRINDER

grinder is the same type as the No. 4, but somewhat lighter. It can also be serviceable in using up stubs from other grinders.

The No. 18 is adapted for polishing and grinding large surfaces and where it is desired to use wheels no larger than 12" in diameter. It is also adapted for using stubs from other grinders which have been worn down to 12" diameter.

The floor grinders made by this company are as follows: No. 73 and No. 74 are of large size, ranging from 2,200 pounds to 3,000 pounds in weight. No. 75 is a medium sized floor machine; No. 77, smaller sized. These are all alternating current grinders. Nos. 20, 21 and 22 are direct current machines.

In a general way advantages claimed for the portable grinders are as follows. The machines are self-contained and balanced, no balance weights or countershafts being required; the machines have ball bearings; wheels may be replaced in the same manner as on the floor grinder; the belt is always open regardless of the position of the machine; no gyroscopic action; A. C. or D. C. motor can be used.

NEW METAL CLEANERS

The Cowles Detergent Company has begun the development of an extensive service organization in the metal cleaning field. It is their intention to go ahead with the rapid building up of the organization and the work has already begun with the services of John J. Vay, Jr., who is covering territory from Cleveland west in the northern part of Ohio and including the section of Michigan south of Saginaw.

This company has long been known as distributors of a unique line of cleansing compounds, but hitherto their chief activity has been in the textile industry, including both the manufacture of the cloth in the first place and the laundering of that cloth as carried on in commercial laundries. The name adopted for the Cowles Cleaners in the metal cleaning industry is Clen-Esco. Announcement is made of a grade for brass and aluminum which has the property of cleaning without tarnish, and without etching the surface of the aluminum. The company states that this is made possible by the patented feature which they have invented of controlling the alkali in the solution.

Another grade of Clen-Esco is announced for moderate duty cleaning and this grade also is used extensively, so the makers state, for brass and aluminum. A third grade is designed for heavy duty cleaning, the stripping of the enamel and point, and similar application.

The basic ingredient of all the Clen-Esco cleaners is a patented material made by patented process and the products are therefore offered as representing something new and distinct in the metal cleaning industry. There is no product like them.

A booklet "How Science Speeds Up Metal Cleaning," has been published and gives the story of the principles of metal cleaning. It is sent on request, to the trade.

CONTINUOUS FURNACE WITH METAL RECUPERATOR

For years metallurgists and engineers have been working in an endeavor to secure practical metallic recuperators for furnaces. The Ludlum Steel Company of Watervliet, N. Y., is using the Delhi Tough rustless iron to provide a material that gives the desired result. The material is used in the form of tubes.

These tubes are 4 inches O. D. by 5/16 inch wall and are 16 feet long. They are welded to manifolds on both ends by oxy-acetylene method. There are a total of 27 tubes in the system.

Air from a No. 8 Sturtevant "Monogram" blower at five ounces pressure is passed into the tubes from a box shaped manifold and after absorbing heat from the hot gases surrounding the tubes, is discharged through a similar manifold at the opposite end into a blast line leading to the burners.

The temperature of the air reaching the burners is about 700° F. The temperature of the flue gases does not exceed 1,300° F. on account of the furnace being of the continuous type in which part of the heat of the hot gases is absorbed in the chamber of the furnace by incoming cold material.

It is stated that the point at which Delhi Tough begins to scale is several hundred degrees above this temperature (1,600° F.) so naturally its application on this kind of work is ideal.

The furnace is equipped with two Hauck oil burners of the flat venturi type with atomization by compressed air. It heats 70 tons of 2 inch square billets per 9 hour shift to a rolling temperature of 2,100° F. The billets are pushed through the furnace by a mechanical pusher.

NEW TINNING PROCESS

A new method of heating sheet metal tinning pots, utilizing electric heat, has been devised by the General Electric Company. Among the advantages claimed for the new method are (1) desired thickness of tin deposited at all times; (2) need of attendance eliminated through automatic control; (3) loss of tin, through overheating and excessive oxidation, eliminated; (4) danger of firing oil eliminated; (5) low maintenance and long life, and (6) better working conditions in the shop.

One of the new, electrically heated tinning pots has been in operation for several months in a steel mill. The tin is heated by means of cast-in electric immersion units located inside the pot and automatically controlled. Temperature fluctuations are prevented, a uniform coating of the sheets is secured and the danger of firing the oil or oxidizing the tin is eliminated. The connected load for the pot is 125 kilowatts and the hourly consumption is approximately 85 kilowatt-hours, giving an average of but 4 kilowatt-hours per base box.

It is expected, that, by the use of the electric method, the over-all cost of tinning will be considerably reduced and a more uniform and better quality of product obtained.

NEW ELECTRIC HOIST

The Northern Engineering Works, Detroit, Mich., has brought out a new type of electric hoist which is now ready for the market, known as the Northern Standart-ized Hi-Lift. The new hoist is essentially the same design as their Standart-ized type "LE" crane trolley.

The hoist is now in production and is described in their bulletin EH-101. The design embodies the high hook lift feature requiring only a minimum of head room and making it available for service in places of limited height. Among some of the outstanding features are hammered steel case hardened gearing, entirely enclosed and running in lubricant, Timken bearings throughout, exceptionally large hoisting drum and rope sheaves, the application of any standard make of motor designed for hoisting service.

Safety features include the enclosing of all working parts, two brakes for holding and controlling the load, and a double set of automatic limit stops that not only limit the upward movement of the load hook, but interrupt the downward movement at the proper distance, thereby preventing injury and difficulties that often occur through allowing the entire length of hoisting rope to unwind and reverse. Spur gearing is employed throughout.

RECLAIMING CORE SAND

The Standard Equipment Company, Inc., of New Haven, Conn., builders of metal reclaiming mills and other foundry equipment, have just developed a new machine for pulverizing old cores and separating all the nails and core wires in one operation. This machine consists of two rolls suspended inside of a revolving screen drum. The rolls are designed so that they will not bend or damage the nails and core wires and are flexibly mounted so that a large piece of metal or any other material will not damage or stall the machine. This machine is especially designed for brass foundries where cores are blown.

PAINT AND VARNISH REMOVER

M. L. Campbell Company of Kansas City, Mo., has placed on the market a Solvent Concentrate with which a varnish remover can be made in quantities up to ten gallons in less than a minute. This solvent concentrate is a by-product solvent naptha containing about 10% naptha, which renders it unfitted for any use except the manufacture of varnish remover. It is stated that when used in connection with alcohol, methanol or a solvent made by this same concern, under the same Stronger Alcohol, it forms a paint and varnish remover which is very efficient and at the same time cheaper than the prepared materials purchasable on the market.

EQUIPMENT AND SUPPLY CATALOGS

Manufacture of Pyrometers. Chas. Engelhard, Inc., New York.

Electric Ventilation. American Blower Company, Detroit, Mich.

How to Clean Metals. Meaker Company, Chicago, Ill.

Variable Speed Plating Machine. Meaker Company, Chicago, Ill.

Facsimile Charts, Scales, Etc. Charles Engelhard, Inc., New York.

Grinding in the Railroad Repair Shops. Norton Company, Worcester, Mass.

Chromium Plating Made Easy. The Metals Protection Corporation, Indianapolis, Ind.

Bridgeport-Keating Flush Valves. Bridgeport Brass Company, Bridgeport, Conn.

Forging Ends of Ladder Rungs. National Machinery Company, Tiffin, Ohio.

Aluminum Omnibuses. Aluminum Company of America, Pittsburgh, Pa.

Welding and Cutting Apparatus. The Alexander Milburn Company, Baltimore, Md.

Ball Bearing Geared Head Engine Lathes. Springfield Machine Tool Company, Springfield, Ohio.

Borolon and Electrolon Grinding Wheels and Polishing Grain. Abrasive Company, Philadelphia, Pa.

Crown Lathes for Polishing and Buffing. Crown Rheostat and Supply Company, Chicago, Ill.

Ruggles-Coles Dryers. Ruggles-Coles Engineering Division of Hardinge Company, Inc., York, Pa.

Proving Ring for Calibrating Brinell Hardness Testing Machines. Morehouse Machine Company, York, Pa.

Blower Systems. Collecting, conveying, ventilating. Containing a discussion of the fundamentals of blower engineering. Kirk & Blum Manufacturing Company, Cincinnati, Ohio.

General Electric Publications. Soldering Iron; Type M-T Control Equipment; Arc Welding; Explosion Chambers for high voltage oil circuit breakers; Constant Speed Induction Motors.

ASSOCIATIONS and SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

AMERICAN FOUNDRYMEN'S ASSOCIATION

HEADQUARTERS, 140 SOUTH DEARBORN ST., CHICAGO, ILL.

The Nominating Committee of the American Foundrymen's Association for the year 1926, consisting of Past Presidents, C. R. Messinger, Chairman; G. H. Clamer, and L. W. Olson, and members-elect P. T. Bancroft, L. S. Murphy, Chas. Suess, and E. S. Van Dalson, elected by mail ballot of the members, have unanimously nominated the following as officers and directors of the Association:

For President to serve for one year: S. W. Utley, Vice President and General Manager, Detroit Steel Casting Co., Detroit, Mich.

For Vice President to serve for one year: S. T. Johnston, Vice President, S. Obermayer Co., Chicago, Ill.

For Directors to serve three year terms each: Martin W. Henley, Vice President, Frazer & Jones Co., Syracuse, N. Y.; N. K. B. Patch, Secretary and Works Manager, Lumen Bearing Company, Buffalo, N. Y.; A. B. Root, Jr., Mechanical Engineer, Hunt-Spiller Manufacturing Corporation, Boston, Mass.; S. C. Vessy, President, W. W. Sly Manufacturing Co., Cleveland, Ohio; L. C. Wilson, Vice President and General Manager, Federal Malleable Company, West Allis, Wis.

MOLDING CONTEST FOR APPRENTICES

In order to encourage apprentices and to direct attention to apprentice training work, there will be held in connection with the 1926 Convention of the American Foundrymen's Association at Detroit, a contest in molding for foundry apprentices. It is the hope of the officers of the association that this contest may become an annual event. At the convention in Milwaukee in October, 1924, such a contest was conducted by the association for foundry apprentices in Milwaukee with satisfactory results in every way. A committee of Milwaukee foundrymen were in charge of the contest. They selected castings to be made in competition by apprentices in various divisions, a board of judges composed of visiting foundrymen was appointed and the contest was held in the foundry of the Milwaukee Vocational School. Substantial cash prizes were awarded by the association to the successful contestants.

This year the contest will be held on a national scale. The apprenticeship committee of the American Foundrymen's Association has selected patterns to be made in competition in both the steel and the grey iron division. Blueprints of these castings are available which very clearly indicate the manner in which the patterns are to be made. Local contests will be sponsored by branches of the American Foundrymen's Association or other recognized organizations of foundrymen or manufacturers. The best castings from each local contest will be forwarded to the convention in September where a board of judges will select the best casting in each division. Each casting will be marked with a number instead of the name of the contestant and the time required to finish the mold will also be indicated for the information of the judges.

Further information regarding this contest together with a full set of regulations and blueprints of castings, can be had of C. E. Hoyt, Secretary, American Foundrymen's Association, 140 South Dearborn Street, Chicago, Ill.

PHILADELPHIA FOUNDRYMEN

HEADQUARTERS, CARE OF HOWARD EVANS, UNION LEAGUE

The 356th Dinner and Meeting (the last until October) was at the Manufacturers' Club on June 9, 1926.

ELECTION OF OFFICERS FOR 1926-7 AS NOMINATED AT LAST MEETING

President:—Walter Wood of R. D. Wood and Company who has been Chairman of the Executive Committee from the start thirty-five years ago.

Vice-President—C. F. Hopkins—2nd Vice-President—Ajax Metal Company.

Directors—Walter Wood, chairman; Fred'k M. Devlin, President of Philadelphia Hardware and Malleable Iron Company—3 years; C. R. Spare—Vice-President Janney Cylinder Company—3 years; H. M. GilesGeneral Superintendent—Westinghouse Electric and Machine Company—2 years; B. H. Johnson—Superintendent Foundries—Cresson-Morris Company—2 years; R. R. Belleville—Dixon Crucible Company—1 year; W. L. Kalbach—Wooden and Metal Patterns—1 year.

Oliver Smally, 2011 Grand Central Terminal, N. Y. gave a lantern slide talk:

First—brass and bronze foundry practice—raw material—melting—molding—use of scrap.

Second—Cast iron, progress made in the last decade—Malleable cast iron direct from the cupola, etc.

TORONTO BRANCH A. E. S.

HEADQUARTERS, CARE OF W. L. BARROWS, 628 DOVER ROAD

The Toronto Branch held its first annual picnic at Howard High Park, June 26, 1926. This picnic was arranged for the benefit of the wives and children of the platers, and naturally the women dragged their husbands along with them, they were coming in little bunches. By the time the crowd arrived Old Sol came out in all its glory and the demand made on Tom O'Keefe for ice cream cones made him discard his vest and roll up his sleeves. John Acheson proved a dandy at the lemonade stand and was quite a favorite as long as the sugar lasted. It isn't often that a bridegroom plays pitcher and catcher at a ball game while on his honeymoon but this actually happened to Eugene Feeley when he represented Montreal at the picnic. He pitched ball for the Silvers against the Cast Irons.

Next came the eats. Mrs. T. O'Keefe, Mrs. J. Acheson, Mrs. J. Cairns and Mrs. J. Loeheed had the arranging of the table and the earnest efforts of those ladies were much appreciated by everyone. After dinner, races were held.

Mr. Bottrell who represented the Hanson and Van Winkle Company became quite popular by his demonstration on the musical drum (this drum had bells and a whistle on it); likewise Charlie Kemish and the peanut scrambles.

Just when everything was all over and everybody happy along came Walter Barrows to say, "so long," as he was going away to the Newark convention.

The first annual picnic proved to be a real success and all were enthusiastic for another in 1927.

AMERICAN ELECTROCHEMICAL SOCIETY

HEADQUARTERS, COLUMBIA UNIVERSITY, NEW YORK

At the last meeting of the New York Section of the American Electrochemical Society the following officers were elected for 1926-1927:

Chairman—Duncan McRae, Guggenheim Brothers Laboratories, New York; Vice-Chairman—C. A. Phillippi, Havemeyer Hall, Columbia University; Secretary—C. L. Mantell, Pratt Institute, Brooklyn.

BRASS MANUFACTURERS

HEADQUARTERS, CITY HALL SQUARE BUILDING, CHICAGO, ILL.

The meeting of the Association was held at the Edgewater Beach Hotel, Chicago, Ill., the first general session taking place on Wednesday morning, June 30, at 10:00 A. M.

LIGHTING FIXTURE MANUFACTURERS

HEADQUARTERS, 424 GUARANTEE TITLE BLDG., CLEVELAND, O.

The Annual Meeting & Convention of the National Council Lighting Fixture Manufacturers was held in the Windsor Hotel, Montreal, Canada, June 23-26, 1926.

Invited to and in attendance at this meeting were manufacturers of lighting fixtures, floor and table lamps, illuminating glassware, incandescent lamps, lighting equipment of all kinds, dealers, jobbers, electrical contractors, architects, builders and importers buying and handling lighting equipment.

Personals

F. C. MESLE

F. C. Mesle, the new president of the American Electro-Platers' Society, entered the employ of the Oneida Community, Ltd., when he should have been in school, nearly thirty years ago. He started in as errand boy, gravitating in some way to the plating department. He went through the various experiences from scrub boy to plater under the tutelage of one of the well known members of the American Electro-Platers' Society, A. G. Reeve. After serving several years as assistant foreman Mr. Mesle was placed in charge of the plating, in 1910. During the war he was released from active oversight of this department to assist in the development of lead plating of interior gas shells.

F. C. MESLE

Since the war he has been connected with the plating room in an advisory capacity as plating expert. He has also served some time in the new development division and research department. At the present time, Mr. Mesle is responsible for the hollow-ware plating which is the Oneida Community's latest development. They entered the hollow ware field during 1926.

The Oneida Community organization is one in which people work together, so what has been accomplished has been the result of group work rather than individual. It was in this company's plating department that the ampere-hour meter was first applied to the controlling of silver deposits. In this and other developments, Mr. Mesle has assisted in making his company's plating department one of the most up-to-date and efficient in the country. Mr. Mesle has been a member of the American Electro-Platers' Society since 1914, and has been editor of the Review for the last three years.

L. E. Diamond, vice-president of James H. Rhodes & Company, is sailing for Europe in regard to the imported chamois skins.

Edward N. T. Faint is now in charge of the polishing and plating department of the International Motor Company, Allentown, Pa.

Raymond Fink, who has been vice president of Pierce, Butler and Pierce, has joined the executive staff of the Sherman Corporation, Engineers, 31 Milk Street, Boston, Mass.

A. Milton Buck has joined the sales force of the Bridgeport Brass Company, Bridgeport, Conn. Mr. Buck will reside in Washington, covering Washington, D. C., and the states of Maryland, Virginia and West Virginia, specializing on sales of Bridgeport-Keating flush valves and Plumrite brass pipe.

Elmer R. Murphey, Chairman, Board of Directors of James H. Rhodes & Company, spent several weeks at the Pumice Warehouse and Mills, Lipari, Italy. They were obliged to erect a couple of additional warehouses to store the pezzame or grinding rock during the dry season in order to avoid using wet rock which is costly to the user.

Francis T. West, who for the past twenty-five years has been Western manager of Watson-Stillman Company, 75 West street, New York, with headquarters in Chicago, has retired. J. F. Coyne succeeds Mr. West, with offices at 549 West Washington Boulevard, Chicago. Associated with Mr. Coyne in the handling of the hydraulic machinery and accessory lines are James T. Lee and John O. Clark.

J. E. Hanson has joined the Ferro Enamel Supply Company, Research Department, Cleveland, Ohio. He graduated from the University of Illinois in 1920 and had his first experiences in enameling in the chemical laboratory of the Benjamin Electric Company. Mr. Hanson has been with the Mellon Institute of Industrial Research for the past six years, engaged in research and development problems on enamels for

both cast iron and sheet iron, for members of the Stove Founders' Research Association.

At a meeting of the Executive Committee of the **New Jersey Zinc Company** recently, the following resolutions were adopted: "Whereas, **Edward V. Peters,** who for the past seven years has served as general sales manager of the New Jersey Zinc Company and its subsidiary, the New Jersey Zinc Sales Company, has tendered his resignation with the intention of entering another line of business, it is, on motion duly made and seconded, hereby resolved, that it is with deep regret and and with a lively appreciation of the valuable service Mr. Peters has rendered this organization that we view his retirement from our sales staff; and further resolved, that we hereby tender to Mr. Peters our most cordial wishes for his continued success in whatever line of business he may engage.

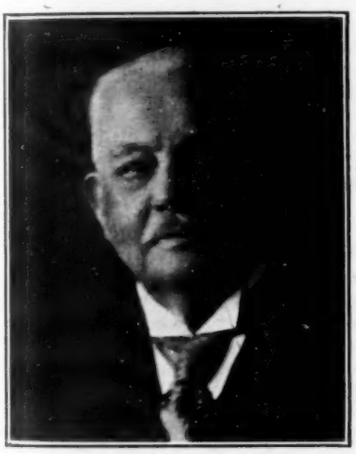
Mefford R. Runyon of Glen Ridge, N. J., has recently joined the sales force of the Bridgeport Brass Company, Bridgeport, Conn. Mr. Runyon is a graduate of Rutgers College, class of '19. He spent two years in service during the World War, and was over seas for a period of 18 months. His first job was in the wholesale hardware business in New York City. He stayed with this concern for six months, at the end of which time they sold out. Then he secured a position as a public accountant with Price, Waterhouse & Company in New York City, staying with them for a period of four years. His next position was with the Benson Rolling Mills in New Jersey, from which concern he came to the Bridgeport Brass Company. Mr. Runyon is at present connected with the New York office of the Bridgeport Brass Company, located in the Pershing Square Building.

Obituaries

URI T. HUNGERFORD

Uri T. Hungerford, chairman of the Board of Directors of the U. T. Hungerford Brass and Copper Company of New York, died at his home, 2 East 56th Street, New York, June 16, 1926, in his 85th year.

Mr. Hungerford was born in Torrington, Conn., December 14, 1841, one of twelve children of John and Charlotte Austin Hungerford. He came from New England stock, dating back to 1639.



URI T. HUNGERFORD

The name has been intimately associated with the brass industry in Connecticut where his father, John Hungerford, in 1834, built the first brass mill in Torrington. Mr. Hungerford always maintained an active interest in the place of his birth and on May 28, 1917, presented to the town the large and completely equipped Charlotte Hungerford Hospital in memory of his mother. In 1855 he attended the West Point Academy where he studied for two years, leaving there to begin his business career in Philadelphia. In 1865 he became associated with Wallace & Sons, brass and copper rolling mills of Ansonia, Conn., acting as their New York representative and manager until 1895 when he established the U. T. Hungerford Brass & Copper Company.

Mr. Hungerford had other extensive business interests. He was president of the Hungerford Securities Corporation, founder of the Hallenbeck-Hungereford Realty Corporation and was largely interested in other companies in the brass and copper and allied industries. He was a member of the Merchants' Association, Machinery Club, Sleepy Hollow Country Club, New York, also one of the charter members of the Hardware Club, New York.

STANLEY M. LAWSON

Stanley M. Lawson, 61 years old, president of the National Brass Manufacturing Company, died of heart disease at his home, Grandin and Edwards Road, Cincinnati, Ohio, recently. Mr. Lawson was stricken suddenly and expired within a few minutes. He was a lifelong resident of Cincinnati. He had been in the brass manufacturing business for the last 35 years. Mr. Lawson was a member of the Queen City Club and the Cincinnati Country Club.

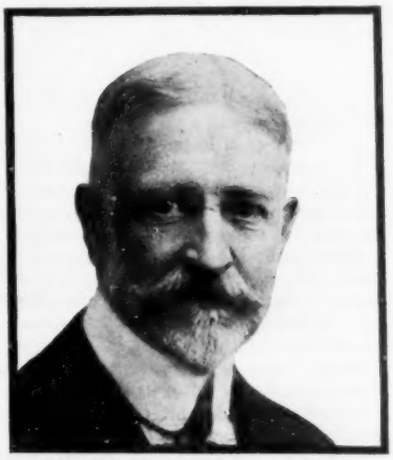
He is survived by his widow, Mrs. Winifred Goodall Lawson, and a son Stanley M. Lawson, Jr., treasurer and superintendent of the National Brass Manufacturing Company; three brothers, Fenton Lawson, Roger Lawson, and George Lawson, and two daughters Mrs. Walter Wilcox and Mrs. Gist Blair.

HUGH JOHNSTON McBIRNEY

Hugh Johnston McBirney, assistant manager of the Chicago branch, National Lead Company, died May 29, 1926. He is survived by his wife and two daughters, Mrs. J. T. Ryerson and Mrs. H. P. Stimson.

Mr. McBirney was born in Cincinnati, January 19, 1853. He attended Yale University, taking a prominent part in athletics.

In the year 1879 he came to Chicago with his father Hugh McBirney, his uncle Morris Johnston and his brother Joseph L. McBirney, who at the time of his death was treasurer of National Lead Company. The McBirney & Johnston White Lead Company was formed and Mr. McBirney was manager of the office. In 1885 the company consolidated with the Southern White Lead Works, of which Mr. McBirney was secretary. Mr. McBirney was later appointed assistant manager.



HUGH JOHNSTON McBIRNEY

Mr. McBirney was a great traveler, a connoisseur of art, active in civic, philanthropic and club affairs and a hearty supporter of music and opera. As president of the Lying-in-Hospital he was active in its construction and growth.

Mr. McBirney leaves a host of friends. His gentle disposition, his patience and ready willingness to lend a helping hand to those in need, created a feeling that their problems were his and endeared him to all.

CLEVELAND HOADLEY DODGE

Cleveland Hoadley Dodge, financier and philanthropist, died at his home, Naumkeag, in Riverdale-on-the- Hudson, N. Y., on June 24th, after an illness resulting from a recent attack of pneumonia. He was in his sixty-seventh year. Mr. Dodge was chairman of the board of the Phelps-Dodge Corporation, New York, one of the world's great copper mining companies.

Mr. Dodge was known throughout the world for his varied and important activities. In business, his company is one of the leaders, supplying huge quantities of copper to most of the metal fabricators in the United States and abroad. Mr. Dodge was active in politics. He was a close friend of President Wilson, worked actively in his campaign and acted as his adviser in his administration. Mr. Dodge would never accept office, however.

He was best known to the public at large for his philanthropic activities, among the most important of which was the conduct of the Near East Relief campaign.

NEWS OF THE INDUSTRY

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS

NEW ENGLAND STATES

WATERBURY, CONN.

JULY 1, 1926.

The United States patent office has granted a patent on an electric induction brass furnace to **David L. Summey** of this city, mechanical engineer of the **Scovill Manufacturing Company.** Mr. Summey is also head of the research department of the company. He is well known as an inventor of apparatus for use in brass manufacturing and a developer of brass making processes. He has been with the Scovill company about 12 years, prior to that being chief engineer for the **Chase Companies, Inc.** While with the Chase companies he designed and built a tube extrusion machine which is still used and held in high regard by brass experts. The Scovill company now has in use a number of electric brass casting furnaces, devised and built by its electrical engineer, Morris Bennett, and known as the "Bennett" furnaces.

An old Waterbury landmark, the Hotchkiss home at the corner of Grand and State streets, adjoining the **American Brass Company** office, has been acquired by the company and the building razed. The land will be utilized eventually for an addition to the office building. The acquisition followed several years of litigation over the question of ownership of the property, resulting finally in a settlement out of court between the company and W. E. Hotchkiss, one time owner of the property.

Portions of a letter from Manager **A. L. Henry** of the export department of the **Chase Metal Works** praising the work of the foreign service of the Department of Commerce were read in the Senate, last month, in support of a bill to put the service on a more permanent basis.

Clifford F. Hollister, treasurer of the **American Brass Company; H. B. Dow,** secretary of the **Waterbury Clock Company; John R. Hughes** of the **Howland-Hughes Company,** and Attorney **T. V. Meyer** have been elected directors of the local chamber in place of four whose terms expire this month. One of those who retired is **John A. Coe,** president of the American Brass Company.

Judgment in default of answer has been given against the **American Briquet Machine Company** in the suit brought by **Herman J. Weisman** and **Samuel Gracerstein,** resulting from the sale of the old **Eastern Brass & Ingot Corporation** plant of this city to Messrs. Weisman and Gracerstein. The suit was over the machinery in the plant. The plaintiffs, it is learned, following the judgment, will sell the machinery and pay the claims of the American Briquet Machine Company.

P. W. Brown of the **Chase Companies** and **H. B. Dow** of the **Waterbury Clock Company** were among the delegates sent by the local Chamber of Commerce to the annual meeting of the state chamber at New London, June 23rd.

John A. Coe, president of the American Brass Company, was re-elected vice-president of the Waterbury Savings Bank at its annual meeting last month. **Irving H. Chase,** president of the **Waterbury Clock Company,** and **John H. Goss,** vice-president of the **Scovill Manufacturing Company,** were among the directors of the bank who were re-elected.

The **Waterbury Castings Company** of this city is filling a very large order for ornamental lamp posts for New York City. The posts are 24 feet in height and weigh 1,000 pounds, while the weight of the heavy base on which they are set is 485 pounds.

William H. Doyle, former head of the Newark, N. J., branch of the **Chase Companies, Inc.,** died at the age of 74 at his summer home in Bantam, Conn., June 6. He was a close friend of the late **H. S. Chase,** former head of the Chase companies and was connected with the concern for over 16 years. For years he purchased and took charge of the company's extensive real estate holdings. F. S. Chase, president of the Chase companies, attended the funeral in Bantam as did many officials and employees of the concern. The bearers were mostly employees of the company.

Royall Victor, recently a practicing attorney in New York City, but formerly chief counsel for the **American Brass Company,** died while racing his yacht at Oyster Bay, L. I., June 8. Death was due to heart disease. He was also a former director of the American Brass Company. **John A. Coe,** president, and other officials of the company attended the funeral.

In an attempt to cut down the number of industrial accidents, the **Scovill Manufacturing Company** has issued a booklet to its employees telling how most of the accidents there in the past few years have happened and how to guard against them. A giant cartoon, showing the "Scovill Accident Man," with the portions of the anatomy involved most frequently in accidents shown in an exaggerated fashion is a feature of the booklet.

The **Farrell Foundry & Machine Company** of Ansonia, last month, won the decision in the patent infringement case brought against it in the United States District Court in New Haven by the **Fulton Iron Works Company.** Judge Edwin S. Thomas entered a decree dismissing the bill of complaint with costs to the defendant. The invention related to a cane mill for extracting juice from sugar cane. The Iron Works Company charged that the Ansonia Company had infringed upon patents which it owned in making such machinery but Judge Thomas held otherwise.—W. R. B.

BRIDGEPORT, CONN.

JULY 1, 1926

Part of a $150,000 attachment in a suit of **Timothy P. Ryan** against **William J. Shaughnessy** was placed on the plant of the former **Metal Products** plant here, but when the case came to trial in the superior court the part of the attachment which affected the plant property was released by order of Judge Alfred Baldwin. Attorney John A. Cornell, counsel for Mr. Ryan, opposed the release but Mr. Shaughnessy testified on the stand that while the property is recorded officially in his name it is in reality owned by the **Eastern Engineering Company.** As a result of the release of the attachment it is expected that the former Metal Products plant will be sold to **Seward & Inman** of Bridgeport for factory purposes at a reported price of $126,000.

One hundred and two members of the **Jenkins Brothers** sales force from every state in the country and from Canada, England, Mexico, China, France and Cuba, attended a dinner at the Straffield here, June 7, and inspected the Bridgeport plant of the valve company the next day. Sixteen candidates were initiated into the Order of the Mongoose, this being the organization of the full-fledged salesmen of the company. **C. B. Yardley** was in charge of the entertainment. **Anthony Weber** was elected head trapper and master of ceremonies.

An hour and a half was spent by 21 officers and directors of the **Westinghouse Electric & Manufacturing Company** in inspecting the **Bryant Electric Company's** plant June 16. They were met by **Waldo C. Bryant,** president; **Gilbert W. Goodrich,** general manager, and **Robert M. Eames,** sales manager, and conducted through the local plant. Among the Westinghouse officials were **Guy E. Tripp,** chairman of the board; **George M. Verity,** president of the **American Rolling Mill** of Middletown, Ohio; **Joseph W. March,** president of the **Standard Underground Cable Company** of Pittsburgh, and **H. H. Westinghouse,** chairman of the board of the **Westinghouse Airbrake Company.**

On the request of the **New England Council,** the Department of Commerce will shortly inaugurate an industrial survey of this area with the assistance of the council, **Dr. Julius**

Klein, director of the bureau of foreign and domestic commerce, has announced. Where New England products are being sold and whether they are being distributed in their own New England market as intensively as possible will be ascertained together with more basic information for gauging the present and potential marketing possibilities of other areas. A thorough examination of all New England industries will be made with the idea of anlyzing their present difficulties in manufacturing and marketing; the relation of New England to its source of raw materials studied and the problem of keeping employment stabilized.—W. R. B.

TORRINGTON, CONN.

JULY 1, 1926

Orville **T. Church,** a salesman for the Union Hardware Company, has moved to Cleveland, O., with his family and will make his headquarters in that city.

Frederick **J. Rudden,** assistant secretary of the Union Hardware Company, is now located in Chicago.

Burning out of a fuse box at the Torrington plant of the **American Brass Company** resulted in the fire department being called by a bell alarm to the plant one night last month. The fire was extinguished with chemicals before any serious damage resulted.

The tonnage of products shipped from Torrington has been higher each month this year than for the corresponding month of last year, according to records here.

The **Torrington Company** last month declared an extra dividend of 5 per cent in addition to the regular quarterly dividend of three per cent.

All but two steam trains have been taken off this division of the New York, New Haven & Hartford Railroad and replaced by passenger busses.

Metal plants here are closing down for periods of one to two weeks this month for the annual inventories.

Announcement has been made of the engagement of **Ralph H. Perry,** superintendent of the **Progressive Manufacturing** plant, and Miss Beatrice Girvin, daughter of Mr. and Mrs. Robert James Girvin.—J. H. T.

NEW BRITAIN, CONN.

JULY 1, 1926

Conditions in the metal manufacturing industries of this section, and more especially in this city, continue to remain steady, with all concerns keeping on regular working schedule with a brisk volume of business to be handled. Although in many branches this is regarded as the off season, in such cases production is being maintained to replenish depleted stock.

The **North & Judd Manufacturing Company** has purchased the **August Buerman Company** of Newark, N. J. This firm is a manufacturer of high grade bits and spurs and has been doing business for many years, having long been a competitor of the local concern.

Merger of the **New England Pin Company** of Winsted, Conn., with the **Star Pin Company** of Derby, Conn., and the **National Pin Company** of Detroit has been completed and the business has been transferred to the Derby plant. The New England Pin Company was organizd in 1854 and was one of the first in the country. The Derby concern has a half million dollar capitalization, while that of the former concern is about $200,000 and the Detroit firm about $150,000.

Death has laid its hands on another prominent manufacturer in the passing away this month of **Henry C. M. Thomson,** formerly president of the **American Hardware Corporation,** from which he resigned because of ill health in 1924. From 1884 to 1901 Mr. Thomson was with **P. & F. Corbin** and was manager of the Chicago office from 1889. From 1901 to 1913 he was with **Hoggson Brothers** of New York and came to the American Hardware Corporation in June of 1913.

Statements coming from the **Stanley Works,** the **Stanley Rule & Level Company, Landers, Frary & Clark** and the various branches of the **American Hardware Corporation** indicate that business at this time is considered good and there is no reason to expect any depression.—H. R. J.

PROVIDENCE, R. I.

JULY 1, 1926.

The end of the first half of the year finds business in most of the metal trades at least slightly improved as to what it was at the beginning of the period. This is true of practically every line excepting the jewelry and small tools. All the building lines are showing more activity than they did six months ago with encouraging prospects of a continuance until well into the winter, at the least. The $2,500,000 Masonic Temple and Auditorium and the 23-story Industrial Trust building are two of the numerous propositions upon which the trades are to be engaged during the coming months.

There appears to be a well defined movement toward the re-establishment of an apprenticeship system on the part of the manufacturers in several of the industries represented in this city and vicinity. For a number of years the manufacturing jewelers, through the New England Manufacturing Jewelers' and Silversmiths' Association, has maintained apprenticeship courses in the Jewelry and Silversmithing Department of the Rhode Island School of Design and during the past year this has been supplemented by the vocational training courses sponsored by the State, of which about a score of young men from the local jewelry plants have taken advantage. The work in the shop was alternated with the school work, a week of each, the boys following practical work in the shops and educational work in their respective lines at the school. The apprentices are paid for their time in both the shops and the schools.

Now, a group of manufacturers of this city and vicinity is offering apprenticeship courses in the machinists' and molders' trades to young men between the ages of 16 and 18 years inclusive. The course, like those conducted in the interests of the jewelry industry, include all-round training on the various jobs, school work of a very practical character and lectures. A carefully considered community plan has been developed with the idea of training all-around skilled workers which are greatly needed in nearly every plant in this section of the country. This movement is being conducted through the Manufacturers' Free Employment Bureau.

The **Gorham Manufacturing Company** has recently completed a heavy bronze roll of honor to be erected in the Lehigh Alumni Memorial Administration Building of Lehigh University, at Bethlehem, Pa., that is the largest tablet ever made by the Gorham Bronze Division. It is English Gothic in design of golden bronze, with a width of 26 feet 1¾ inches and a height of 9 feet 4⅛ inches and weighs over two tons. The tablet contains twelve panels bearing the names of 1,921 Lehigh graduates and undergraduates who served in the World War and 46 names in the centre panel of those who died.

A. Sheehan & Company, Inc., of Providence, have been granted a charter under the laws of Rhode Island for the manufacture, sale and use of lacquering, etc., with an authorized capital stock consisting of 500 shares of common stock without par value. The incorporators are: A. Sheehan, Christopher L. Migliaccio and Fritz Johnson, all of Providence.

Charles S. Williams has recently started in business at 217 Chapman street, under the firm name of **C. S. Williams Lacquer Company,** carrying a general line of chemicals, etc., for electro-platers and manufacturing jewelers.—W. H. M.

MIDDLE ATLANTIC STATES

ROCHESTER, N. Y.

JULY 1, 1926

Pleasant news received in business circles in Rochester this month is the awarding of a contract to **General Railway Signal Company** by the Chicago & Northwestern Railway for railway signal equipment to the value of $5,000,000. This unusually big contract will provide increased employment at the signal company's extensive plant in Lincoln Park, and require a great deal of metal such as copper, brass, bronze, nickel, lead and tin-plate.

Business activities about the city are not quite so pronounced as a few weeks ago, seasonal slackening making its appearance here and there among the larger plants. Not so many mechanics are employed at the **Eastman** plants as at this

time last month, while production shows no real falling off at the **Todd Protectograph Works,** the **Stromberg-Carlson** plant, or at any of the several can factories about town. Increased business is reported from the **Bausch & Lomb** optical works since reorganization.

Production among the brass foundries and plating shops about Rochester is reported to be very steady and satisfactory all around. There have been no idle times about these branches of the metal trades since last November, orders for small metal parts and building materials keeping up to a high standard to the present time. Foundrymen predict a continuation of good business in their lines all summer, despite the fact that trade usually declines during that period.—G. B. E.

TRENTON, N. J.

JULY 1, 1926

The **Guaranty Trust Company** of New York has been authorized by Judge Rellstab in the United States District Court to institute foreclosure proceedings against the **Jordan L. Mott Company** of this city, on a mortgage of $2,000,000. Claims filed against the company amounted to $3,800,000. Permission to sell the company as a going concern was asked some time ago by **Charles H. Baker** and **Robert K. Bowman,** receivers for the company. Judge Bodine at the time of the application allowed an order to show cause by creditors and stockholders of the company why the company should not be sold. Approximately half of the amount of the mortgage which the Guaranty Company as trustee was given permission to foreclose is held by the estate of Andrew Carnegie.

The effect of the court order, it is believed, will not mean the immediate sale of the plant. The mortgage is said to have been drawn in such a manner that title cannot pass for at least three months from June 1, which was the date of maturity. Herbert B. Noble, New York attorney, has a plan of reorganization which it is understood he will press under the interval. It is believed the foreclosure proceedings will speed the reorganization movement. The Trust Company claims that the mortgage covers both the real estate and personal property, but the executives of the Mott Company insist that it is not so broad in scope. The scheme of rehabilitating the company called for retirement of the $2,000,000 obligation by the majority stockholders and the subscription of $1,000,000 in capital stock.

Infringement of patents on the selective tuning system of radio receiving sets is charged in a suit brought in the United States District Court at Trenton by the **Radio Corporation of America,** of Delaware, and the **General Electrical Company** of New York against the **Splitdorf Electrical Company** of New Jersey. The suit is said to involve a million of dollars. The plaintiff companies seek a permanent injunction restraining the Splitdorf Company from manufacturing the radio parts and asks the court to assess damages, after an audit has been made of the profits accruing from the sale of the patented devices sold by the defendant company. The plaintiffs maintain that they hold exclusive patent rights on the tuning system now in general use on radio sets; the Splitdorf Company contends that the instrument involved was in popular use before the patent secured by Ernst W. Alexanderson in 1913, and contends that the patent does not comply with Federal statute requirements.

Colonel Washington A. Roebling, president of the John A. **Roebling's Sons Company,** on May 25 celebrated his 89th birthday anniversary at his West State street home at Trenton. Despite his very active life, Colonel Roebling has enjoyed unusually good health until a short time ago. Because of his illness the celebration was not on a large scale.

Ferdinand W. Roebling, Jr., vice-president and general manager of the John A. Roebling's Sons Company, contributed $25,000 to the drive to raise $500,000 for Mercer Hospital at Trenton. Other members of the Roebling family also contributed liberally.

Following concerns were incorporated here: **New Jersey & Connecticut Dri-Steam Valve Sales Company,** Paterson, manufacture valves, $50,000. **Pan Manufacturing Company,** manufacture metal goods, Jersey City, $100,000 preferred, 10,000 shares common. **Eastern Mining & Refining Company,** Trenton, $125,000, refine metals. **Northern Jersey Equipment Company,** Morristown, electrical goods, $100,000. **Silen Automatic Corporation of Northern Jersey,** Paterson, manufacture burners, $100,000.—C. A. L.

PITTSBURGH, PA.

JULY 1, 1926

Reports for the early weeks of May indicate increases in business activity as compared with the same weeks of 1925. Larger production of bituminous coal, beehive cake, larger awards for building construction, larger distribution of merchandise, as measured by car loadings, were reported during this period compared with the corresponding weeks of 1925.

During June, hardware was in fair demand. Both production and sales of electrical merchandise are about the same as they were a year ago. Radio equipment is inactive. Demand for plumbing and heating equipment has shown some improvement lately. Trade in mill and oil well supplies has been fairly good, but mining equipment is very dull.

The **Westinghouse Electric & Manufacturing Company** has a building program for $5,000,000, part of which is already under way, it was announced recently. A major portion of the building construction is to be done in Pittsburgh and Western Pennsylvania. The projected work involves a $1,500,000 office building now almost completed at the East Pittsburgh works, a mill at Sharon and an office structure at Derry. New buildings are also planned at Mansfield, Ohio; Detroit, East Springfield, Mass., and St. Louis, Mo.—H. W. R.

MIDDLE WESTERN STATES

CLEVELAND, OHIO

JULY 1, 1926

Employment in the Cleveland metal trades has increased during May and June, according to a statement issued by **Andrew Frew Long,** manager of the **American Plan Association.**

The **Rickersburg Brass Company,** forced to move from its location at East 37th street and Chester avenue, because of the extension of the latter thoroughfare by the city, has started work on its new plant at Perkins avenue and East 37th street. The office building will be 36 by 121 feet, one story, brick, as will be all buildings. The factory, 121 by 200 feet, will be erected immediately in the rear of the office. The foundry will be 60 by 200 feet and the boiler room, 43 by 32 feet. The buildings will be completed this summer.

Incorporation papers were recently issued in Columbus for the **Cleveland Metal Lathe Company.** Capitalization is $2,500. W. J. Hughes, H. E. Hogan, Aaron Morganstern, Walter Carmack and Morris J. Fishman are incorporators.

Antioch College, Yellow Springs, O., recently started a course in foundry work and sculpture. A bronze foundry has been established, the first in an educational institution in Ohio.

Officials of the **Westinghouse Electric & Manufacturing Company** inspected recently the Mansfield plant as part of their tour of all Westinghouse plants. The Mansfield works were praised for having made exceptional progress in efficiency of production since their establishment. Especially commended was the conveyor system for speeding up manufacture. The party left on a special train for Pittsburgh after touring the Mansfield plant under the guidance of **J. S.** Tritle, general manager of the merchandising department; E. M. **Olin,** works manager; **Frank Thornton, Jr.,** engineering department manager, and others.—S. D. I.

DETROIT, MICH.

JULY 1, 1926

The **Howerton Lacquer Corporation** has been organized at Grand Rapids, to manufacture and deal in lacquers, etc. The stockholders are C. N. Howerton, Burt R. Smith and J. F. Howerton, 1546 Lawndale avenue, Grand Rapids.

The **Agnew Electric Welder Company** has been incorporated at Milford, Mich. It will manufacture and deal in electric welding machines. Its capital stock is $50,000.

It is announced that the Mueller Brass Company, at Port Huron, has perfected a new white metal alloy for the plating industry.

The **Reliable Smelting Company,** at Grand Rapids, plans to erect a factory unit costing $35,000.

During 1925, the Flat Rock plant of the **Ford Motor Company,** shipped 899 carloads of lamps to the Ford assembly plants. The Flat Rock plant is the largest of the five small water-power plants operated by the company in the vicinity of Detroit. It is located in the southern portion of Wayne County and receives its power from the Huron River.

The **Stinson Airplane Syndicate** has recently been organized in Detroit with a $300,000 capital stock, for the purpose of manufacturing the plane developed by **Edward A. Stinson,** veteran Detroit pilot, in a factory at Northville, Mich., a suburb of Detroit. The Northville plant formerly was occupied by a scale company. It provides 25,000 feet of floor space. The first planes probably will be turned out sometime around July 1.

It is announced that directors of **Edmunds & Jones** and the **Hall Lamp Company** will, in the near future, submit a merger plan to stockholders providing for the formation of a new company, the **Edmunds-Hall Corporation,** which will have outstanding, it is said, $750,000 of six per cent bonds and 363,000 shares of no par value common stock of an authorized issue of 500,000 shares. Holders of Edmunds & Jones common will receive three shares of stock of the new company and a bonus of $5 a share in cash. Holders of the Hall Lamp stock will exchange on a share for a share basis and receive $2.50 a share in cash. Edmunds & Jones preferred stock will be retired.

CHROMIUM PLATING AT OLDS MOTOR WORKS

A brilliant blue-white plating that is unaffected by climatic conditions and is practically rust and wear proof has been perfected by the Olds Motor Works at Lansing in co-operation with the General Motors Corporation Chromium, one of the hardest metals known, is used instead of nickel for plating such parts as radiator shells and caps, bumpers, gear-shift levers, etc. It coats these parts with a material approximately as hard as sapphire and has high resistance powers against corrosion. The idea of plating with this substance is not new but heretofore no method, it is stated, has been developed that would lend itself to industrial application. In fact, its status was more theoretical than practical until slightly more than a year ago when development work was started by W. M. Phillips, a member of the staff of the work's managers committee of the General Motors Corporation. He was assisted by experts of the General Motors research laboratories and the Oldsmobile organization. The experiments were conducted in the Oldsmobile metallurgical laboratory and plating department. The initial steps of chromium plating follow the identical process in nickel plating. The part to be plated is taken as it comes from the stamping machine and polished on emery wheels to give it as smooth a surface as possible. It then is cleaned in a solution developed by the General Motors Corporation, after which it passes through an electro-copper plating bath composed of copper cyanide base solution. A high electrical amperage is used to give a smooth, close grain to the plating. After passing through a washing tank, the usual procedure is to buff the part being plated, but this step is eliminated in the chromium process. The part then is given a coating of nickel plating, which forms a white background and base for the final chromium coat. It then is buffed and again washed and then is ready for the final chromium plating. The tank used for the chromium plating, the solution, electrical anodes and process used were all developed by the Oldsmobile and the General Motors Corporation and it is these points that make the new plating method possible. —F. J. H.

CHICAGO, ILL.

JULY 1, 1926

Gillette Products Company, 19 W. Austin avenue, have been granted a charter by the Secretary of State. They will manufacture and deal in materials for autos, auto trucks and other vehicles. The incorporators are: Charles R. Gibe, DeWitt Cleland, R. G. Phelps, with Lee Phelps and Cleland the correspondent. Their office is at 155 N. Clark street.

Alexander & Withers Manufacturing Company, Inc., 54 West Lake street, are incorporated for $20,000, to manufacture and deal in tools, dies, metal products and specialties, metallic auto accessories. James Withers, Elizabeth E. Withers, Vern P. Alexander are the incorporators. The correspondent is Samuel F. White, Jr., 10 South La Salle street.

James B. Lewy Company, Room 507, 31 North State street, has received a charter and been incorporated for $5,000. They will manufacture and deal in jewelry, precious stones metals and art objects, etc. Leo Kahanweiler and Jay B. Lew are the incorporators. Correspondent, Sonnechin, Berkson, Luatmann and Levinson, 77 West Washington street.

Advance Railway Equipment Company, 80 East Jackson Boulevard, have been granted a charter and capitalized for $20,000. They will manufacture and deal in metal and railway specialties. Supplies and equipment and parts therefor. Incorporators: F. C. Rutz, H. E. Anderson, F. A. Welsh. Correspondent, Welsh & Welsh, attorneys at law, Rockford.

Hess Fischrupp Electric Company, Inc., 6600 S. Halstead street, are capitalized for $10,000. They will deal in electric appliances, washing machines and toasters. Incorporators: Carl A. Hess, Tom Leeming and W. A. Pease. Correspondent, Loucks, Eckert and Peterson, 10 South La Salle street.—L. H. G.

OTHER COUNTRIES

BIRMINGHAM, ENGLAND

JUNE 15, 1926

The coal strike has naturally affected the non-ferrous trades of Birmingham, but the stoppage is most seriously felt in the larger branches of the industry. For example, in the nickel trade, which include some very large factories, one firm alone uses several hundreds of tons of coal and coke per week, and is obliged to discriminate in the execution of its orders, concentrating on those considered most important and urgent. There is an excellent demand for nickel, necessitating the acquisition by **Henry Wiggin & Company, Limited,** of a new factory which commenced operations shortly after Whitsuntide. This metal is so much used now in various alloys, that the demand is continually expanding.

Similarly, in the brass and copper trades the concerns most seriously affected are those producing tubes, sheets, etc. One of the largest manufacturers of condenser tubes has its order book crowded with business. These tubes are wanted for great power plants and electric light undertakings in Birmingham, Manchester, London and elsewhere, and there are very good orders also for shipbuilding and for locomotive construction. If this work is held up for any considerable time the effect will be serious, in holding up a great deal of engineering construction and throwing many men out of employment.

The strike has been a great misfortune to the motor and motor cycle trades, coming as it has in the the middle of the selling season. One firm alone reckons its losses in orders totalling thousands of motor cycles. Large stocks are prepared in anticipation of a big demand, and these have not been disposed of. This is a serious matter, as patterns change frequently, and the manufactures of one season are of low selling value for the next. The injury to the cycle business carries with it loss of trade also to cycle accessories and the aluminum trade which increasingly provides material for motor and motor engine construction. To an increasing extent the bonnets of motor cars are made of aluminum sheeting, and more and more of the engine parts are of this material.

The bedstead trade is carrying on much as usual, orders being rather better than at this time last year, very good business having been received from Egypt, Australia and several of the Colonies. This trade is generally concentrating on various parts of the British Empire. But such countries as Egypt, Australia and New Zealand are increasingly importing

parts and building their own bedsteads. Wooden bedsteads, of course, are more popular than ever, but the metal bedstead trade maintains its activity, and the recent exports show no falling off. The association, which for a time controlled prices, came to an end at the beginning of the year, and the trade is, therefore, subject to unrestricted competition. The brass trade generally is very busy.

Probably, Birmingham as a city is less affected by the coal strike than any manufacturing center because the enormous number of small machines employed render them specially applicable to electric driving. In a great many shops other forms of motor have disappeared. The case is rather different with the heating and melting of metal, coke being extensively used for brass casting, although experiments are being made with oil, which it is hoped may reduce the dependence on coal and coke. A brisk demand exists for stampings of all sorts, business this year being well above the average of a year ago. Very good orders for brass stamping are arriving from the Dominions, and although a certain amount of foreign competition exists, trade is fairly plentiful. In the tube trade, some orders have gone to the continent, through the inability of Birmingham makers to guarantee deliveries.

One of the effects of the coal strike has been to give a great impetus to the use of oil stoves and cooking apparatus. Some of these are of Swedish origin, containing considerable quantities of brass and copper. These stoves are rapidly being disposed of, the principal complaint being that, with transport deficient, it is impossible to get supplies to meet the current demand. The makers of oil stoves in Birmingham, as well as of electric heating apparatus are full of work, and expect this kind of business to make further progress after the strike. Makers of wireless apparatus are very busy. This class of manufacture has developed enormously, so many of the makers of pens and small brass goods find it very convenient to change over to the production of wireless parts of all sorts. The factories producing these goods are enlarging and generally increasing their capacity.

The jewelry trade has been one of the first to experience the evil effects of the strike. As a luxury industry, it is quite usual for jewelry to be neglected when strikes or other stoppages threaten the purchase of necessaries. So far, the non-ferrous metal trades have not been hampered for lack of raw material; fairly large supplies are available, and at the end of the railway strike these were liberated so that there are no complaints of shortage in this direction. The electro-plate industry has become very quiet. Prospects are improved by the placing of some shipbuilding orders and some business has come through the renewal of supplies by hotels and other moderately large users of plate. The export trade is dull with not much sign of improvement.

It is generally agreed that the imposition of duties on clocks and watches has been of no substantial benefit to British manufacturers. The interval which elasped last year between the announcement of the duty and its actual imposition enabled very large quantities to be purchased, with the result that many thousands of pounds were spent in laying in stocks, some of which were brought over from France by aeroplane, a proportion in an unfinished condition. Large quantities of these are still on hand, and the necessity for turning these stocks into money has induced the retailers to supply them at the pre-tax price. Birmingham is an important center of the watch case industry, one factory producing the largest output of watch cases in Europe. Its capacity is 4,000 cases per week, and the work is don throughout from the rolling of the 18 carat ingot to the production of the finest detail. The firm alloy their own metals and produce quantities of chains in all gages by the latest machinery. The concern has an interesting association with the **Waltham Watch Company** of Waltham, Massachusetts, understood to be the largest concern of its kind in the world. Aaron L. Dennison, described as the "father of international watch making," founded the **Dennison Watch Case Company,** and one of his descendants, Mr. Gilbert Dennison, is a director of the Dennison Watch Case Company, Limited, of Birmingham. Large numbers of foreign watch mechanisms are enclosed in English cases, thousands of which are turned out by this company.—J. H.

Business Items—Verified

Charles Polacheck & Brother Company, 518-520 State street, Milwaukee, Wis., are contemplating the erection of a brass foundry.

Robert A. McIntyre, treasurer of **Gunning Iron & Brass Foundry Company,** Shawmut street and Hathaway road, New Bedford, Mass., announces that they are undecided whether to rebuild their burned plant.

Gibb Welding Machines Company, Bay City, Mich., manufacturer of electric arc, spot and seam welders, broke ground June 10, 1926, for an addition to their factory that will more than double the present floor space.

The **Boyertown Casket Company** of Boyertown, Pa., suffered a fire recently which destroyed part of their large metal building. No machinery was damaged but about 2,500 caskets were burned. A contract has already been let for rebuilding.

Lincoln Brass Foundry, 911 North Wilbur Street, South Bend, Ind., will move its plant to Mishawaka, Ind., in the factory formerly occupied by the Werra Aluminum Company. This firm operates the following departments: brass, bronze and aluminum foundry.

The **Benedict Proctor Manufacturing Company,** Trenton, Ont., Can., manufacturer of silver plate ware, jewel boxes, etc., will build an addition to its factory. This firm operates the following departments: casting shop, spinning, plating, rolling mill, soldering, polishing, lacquering.

The **Springfield Aluminum Plate and Castings Company,** South Yellow Springs Street, Springfield, Ohio, has almost completed its new foundry and machine shop. E. A. Parker is president and general manager. This firm operates the following departments: aluminum foundry, machine shop, pattern department.

E. Reed Burns & Sons, Inc. of 1811-13 Carroll Avenue, Chicago, announce the addition to their sales force of **Thomas E. Howard.** Mr. Howard, whose home is in Cleveland, Ohio, will cover the states of Indiana, Illinois and Iowa, for the above concern, which also has a plant at Cleveland, Ohio, and the home office in Brooklyn, New York.

The **Bridgeport Brass Company** of Bridgeport, Conn., announces the appointment of **William J. Butler** as salesman of Bridgeport-Keating flush valves, Plumrite brass pipe and Bridgeport tubular plumbing goods, calling on architects, jobbers and plumbers in Northern New England. Mr. Butler will make his permanent residence in Boston.

Taunton-New Bedford Copper Company, Taunton, Mass., has appointed the John H. Heimbuecher Metals Company, 514 North Third street, St. Louis, Mo., as agent in that city and the Middle Western states. Preparations are being made to carry a complete assortment of Eagle Brand sheet, roll and strip copper. O. B. Suck is vice-president and manager of the St. Louis agency.

The **Milwaukee Die Casting Company,** Milwaukee, Wis., is erecting a building at 291 Fourth street. The firm is moving the equipment from an old foundry into this new addition. The old foundry will be used as an aluminum die casting department. This firm operates the following departments: bronze, and die cast aluminum foundry; brass machine shop, tool room, die casting shop.

Philadelphia Rust Proof Company, Philadelphia, Pa., which specializes in the rust proofing of iron and steel by the Udylite Process of cadmium coating and Parkerizing, has recently moved its plant to Montgomery avenue at Howard street, and enlarged it to include sherardizing as well as the above processes. All work is done under the supervision of a chemical engineer, M. G. Herbach. This firm will exhibit at the Sesqui-Centennial.

The **William A. Hardy & Sons Company,** operating a brass foundry in Fitchburg, Mass., has adopted a group insurance program providing both life insurance and health and non-occupational accident protection for its employees. The life insurance totals approximately $65,000. The insurance is be-

ing underwritten by the Metropolitan Life Insurance Company on a co-operative basis whereby premiums will be paid jointly by the employer and employees.

The Milwaukee works of **S. F. Bowser & Company, Inc.,** Fort Wayne, Ind., at 122 Reservoir Avenue, in which production recently was discontinued following consolidation with the main works at Fort Wayne, are being dismantled and will be sold. Representatives of the Bowser company are on the ground to effect disposition of the entire equipment, including milling machines, lathes, shapers, drill presses, threaders, punches, nickel-plating and miscellaneous equipment at private sale. This firm has its own foundry making, brass, aluminum and grey iron castings. The following departments are operated: brass, bronze, aluminum foundry, brass machine shop, tool room, grinding room, galvanizing, brazing, plating, japanning, stamping, soldering, polishing.

The **Dictaphone Corporation,** through Alfred Bodine, vice-president and general manager, have come to an agreement with the **American Canadian Properties Corporation** representative, **Theodore H. Beard,** to purchase the plant of the **Columbia Phonograph Company** at Howard avenue and Cherry street, which the former concern has occupied under lease for the past three years. Deeds have not yet passed in the transaction, but it is thought it will involve about $200,000. The deal included nine buildings in all, having an aggregate floor space of 125,500 square feet. There are about 50,000 square feet of land. When the Columbia Phonograph Company went into bankruptcy, the property was turned over to the American Canadian Properties Corporation, the liquidating agency.

INCORPORATIONS

J. Holland and Sons, 489 Broadway, Brooklyn, N. Y., has incorporated under the name of **J. Holland and Sons, Inc.** This firm will carry a large stock of used polishing and plating and metal working equipment.

Paramount Welded Aluminum Products Corporation, Brooklyn, N. Y., has been incorporated to engage in welding and general sheet metal work, specializing in aluminum, Monel, Duralumin and various other metals and alloys. This firm has done mostly tank and container work, although it is equipped to handle sheet metal work of all kinds.

Laclede Brass Works, Inc., St. Louis, Mo., has been incorporated with $50,000 capital, to engage in general jobbing business, both casting and finishing in the non-ferrous line. This firm is the patentee of the Laclede sun visor; and manufactures and distributes the Saliger patented rubber rammer butt. The Saliger patented rubber rammer butt is used in the core-room and foundry wherever air rammers are used.

Luminite Products Company is the name of a new organization formed to succeed the Salamanca Foundry & Machine Works, Salamanca, N. Y. Capital will be increased from $60,000 to $125,000. A portion of the present plant will be used as foundry and machine shop and a new building, 50 x 80 feet, will be erected. Officers are: John Walrath, president and treasurer; W. M. Greene, secretary, and Paul E. Luther, vice-president. The company manufactures a special aluminum roll for printing wall paper and routing machines for cutting designs on the rolls, and also casts and machines brass, bronze and aluminum castings to specifications and blue prints.

Industrial and Financial News

FARREL COMPANY CELEBRATIONS

The Veterans' Association of the Farrel Foundry & Machine Company, Ansonia, Conn., one of the largest machinery manufacturing plants in the world, recently held its annual dinner. Although previous annual affairs of the Association had been very much enjoyed, the recent dinner was considered by the 90 guests present "the best yet," the entertainment as well as the dinner being of more than ordinary significance.

Following the repast, the long-time employees of the Farrel Foundry & Machine Company, listened to a very interesting talk by Charles F. Bliss, president of the concern, during which Mr. Bliss very forcibly brought out the fact that if the business of the world is to be carried on steadily there must be world peace. He also made other remarks which showed his interest in international friendship and world prosperity, and at the conclusion of his talk he received much applause from the gathertng.

The entertainment features included selections by well-known singers and pianists.

Among the officials of the Farrel Foundry & Machine Company, present at the dinner, besides Mr. Bliss, were: Franklin Farrel, Jr., 1st Vice-President; George C. Bryant, Secretary; Carl Hitchcock, Assistant Secretary; and Frederick M. Drew, Jr., Assistant Treasurer.

The Veterans' Association of the Farrel Foundry & Machine Company is at present composed of 121 employees who have been with the Company for 25 years or more. Only 31 of these are pensioners. The average length of service of the members of the Association is 33 years—a figure which speaks well for the concern and for the employees themselves.

ANNUAL OUTING OF FARREL FOUNDRY AND MACHINE COMPANY MEN

The annual outing of the Office and Engineering Department and the officials of the Farrel Foundry & Machine Co., Ansonia, Conn., was held at Double Beach, Conn., on Saturday, June 26th. Lunch was served immediately on arrival at the shore resort after which a baseball game between the married men and the single men was enjoyed. The baseball game was followed by other athletic events, which were much enjoyed.

After the athletic events ended a fine shore dinner was served, at the conclusion of which short addresses were made by various officials of the concern.

ALUMINUM IN EAST INDIES

A recent report from Riouw (portion of Malay archipelago, southeast of Singapore) states that an investigation made of the aluminum deposits in the Riouw archipelago has produced encouraging results. It is understood that further developments are pending the completion of preparatory arrangements between well-capitalized concerns, who will probably undertake exploitation in conjunction with the proposed nitrogen factory in the Celebes.

In the meantime 20 tons of the ore have been forwarded to Europe for further inspection. It is reported further that in the event of these plans materializing an arrangement will need to be made with the owners of the rubber and gambier plantations in the areas concerned, as the richest ore deposits are said to occur in these lands. (Trade Commissioner C. P. Goodhue, Batavia in Commerce Reports.)

SHENANDOAH'S METAL SALVAGED

Much of the metal salvaged from the wreck of the airship Shenandoah may be utilized in the construction of the two new giant dirigibles provided for in the five-year building plan for the Naval Air Service, which Congress approved a few weeks ago, Rear Admiral William A. Moffett, Chief of the Bureau of Aeronautics of the Navy Department, announced in Lakehurst, N. J., June 19, 1926.

The metal framework of the Shenandoah was salvaged by the Aluminum Company of America and was taken to Pittsburgh, where it has since been melted down. Naval officers here explained that since the Aluminum company is probably the only company in America able to supply duralumin in sufficient quantities for the two new ships they are almost certain to get the metal contracts.—New York Times.

ALUMINUM PROMOTER IN NOVEL

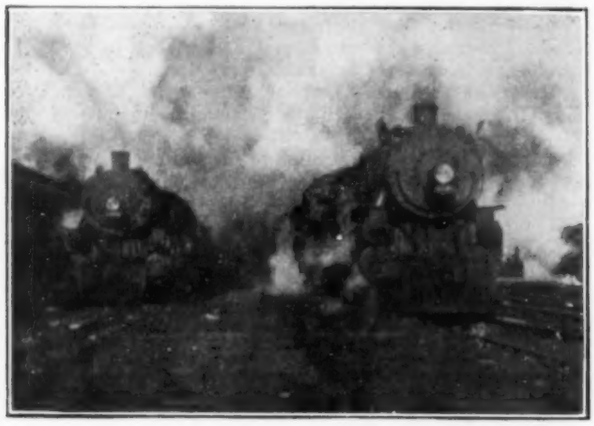
Peter B. Kyne, novelist and short story writer, testified in the Federal court in Los Angeles, Cal., June 16, 1926, that William E. Duersten, former head of the American Aluminum Metal Products Company, accused of using the mails to defraud, was the inspiration for "The Go-Getter," the central figure in one of his novels.

The writer was a witness at Duersten's trial. He also was a director in the defunct aluminum concern. Kyne told the Court that Duersten was such a convincing talker he had incorporated much of the promoter's conversation in his book.

The Government charges that Duersten defrauded stockholders of the company out of nearly $500,000. Kyne is alleged to have been one of his victims.—New York Times.

PHOTOGRAPHS BY WIRE

Since telephotographs—pictures transmitted by wire—were introduced to the business world about two years ago at the Republican National Convention, one business house after another



TELEPHOTOGRAPH OF TWO SECTIONS OF TWENTIETH CENTURY LIMITED

has been awakening to the possibilities of this new development in communication, until today widely varied interests are creating a demand for the service.

One striking example of the use of telephotographs to save time and expense is illustrated by the experience of a large eastern industrial corporation. A conference of the executives of the business had been called to meet in New York to discuss an important contract. On the day prior to the conference it developed that the only obtainable copy of the contract was in San Francisco. To wait for a facsimile contract, sent by the fastest mail service, would have ment the loss of valuable time. But a telephotograph of the contract was sent from San Francisco to New York and delivered one hour before the meeting was held.

Pictures of news events are being telephotographed across the country almost daily. A photograph originating in San Francisco will appear in the San Francisco, Chicago and New York newspapers on the same day.

In addition to these cases, uses for telephotographs are coming to light in an almost unlimited field. Among the suggested uses are: Portraits of any size or kind, pictures of celebrities figuring in the news of the day, scenic views from distant points, mechanical drawings, pictures of machinery, either the entire unit or any of its parts, up-to-the- minute fashions, sports contests, advertising layout and proofs, checks and other financial papers, x-ray pictures and electrocardiographic tracings, textile designs, wills and similar legal documents.

Fifty years ago the telephone stood on the threshold of business just as the telephotograph stands today. Thousands of people now living have witnessed the phenomenal growth of local and long distance telephony. Who will venture to predict the diverse uses made of the electrical transmission of pictures fifty years hence?

Manhattan Brass Liquidation

The Manhattan Brass Company of New York after an existence of sixty-three years was liquidated by a sale at auction of its equipment and stock on June 10 and 11, 1926. This sale was carried on under the management of the Industrial Plants Corporation, auctioneers at 25 Church Street.

Up to the time of its liquidation the company employed 452 men, a number of whom had seen many years continuous service; one employee had a record of forty-five years. It was stated by F. R. Shore of the Industrial Plants Corporation that all of the men who wished to take other work had been placed either in local plants or in New England. Some of the employees, however, had retired to farms.

Among the departments of the business disposed of were the following:

Brass plating shop, brass foundry, buffing and polishing room, nickel plating shop, architectural department, spinning department, machine shop, lamp department, burner department, tube and rod drawing mill, rolling mill, brass ingot foundry, stamping room.

It may be of interest to the trade to know that a number of lines were bought out almost completely by various firms interested in these specialties. Some of these purchasers were:

S. W. Farber Company, Brooklyn, N. Y. Stationery goods.

F. H. Lawson Company, Cincinnati, Ohio. Cuspidors.

Art Brass Company, Stroudsburg, Pa. Andirons, etc.

Peerless Manufacturing Company, Louisville, Ky. Candlesticks.

Scovill Manufacturing Company, Waterbury, Conn. Builders' hardware.

Otto Bernz, Newark, N. J. Blow torches.

Over 350 buyers were present at the sale, 92 of whom came from out of town, representing New England, the Atlantic States, Middle West and South. Among the prominent buyers were Koppen Metal Products Company, Union Hill, N. J.; Hipwell Manufacturing Company, Pittsburgh, Pa.; Waterbury Brass Goods Manufacturing Company, Waterbury, Conn.; American Sheet Metal Works, New Orleans, La. The Chase Companies of Waterbury bought most of the metals.

Fabricated and partially made up brass sold for 10 to 10½ cents per pound at the auction. No price was disclosed for the purchase by the Chase Companies.

An important feature of this liquidation was the fact that the equipment which was 50 years old and which had been carried on the books for $65,000, brought a total of $110,000.

METAL STOCK MARKET QUOTATIONS

	Par	Bid	Asked
Aluminum Company of America	...	$ 73	$ 76
American Hardware Corporation	$100	81	83
Anaconda Copper	50	46½	47
Bristol Brass	25	6	10
International Nickel, com	25	36¾	37
International Nickel, pfd	100	103	..
International Silver, com	100	91	93
International Silver, Pfd	100	100	105
National Enameling & Stamping	100	22½	23½
National Enameling & Stamping, pfd	..	75	81
National Lead Company, com	100	158	159
National Lead Company, pfd	100	117½	118½
New Jersey Zinc	100	185	190
Rome Brass & Copper	100	122	135
Scovill Manufacturing Company	..	225	235
Yale & Towne Mfg. Company, new	..	67	68

Corrected by J. K. Rice, Jr., Co., 120 Broadway, New York.

Review of Wrought Metal Business

Written for The Metal Industry by J. J. WHITEHEAD, President Whitehead Metal Products Company of New York, Inc.

JULY 1, 1926.

Those of the industry who were inclined to regard the future with pessimism about sixty days ago, were obliged to readjust themselves to the condition of most active prosperity which developed in place of the slump which had been partially expected. As a consequence, some of the mills who were inclined to view the future with doubt and allow their stocks of metal to run low, have found themselves short, and deliveries of all kinds of brass and copper materials, such as sheets, rods, tubes and wire are now slower than they have been at any time for the past several years. The mills are especially rushed on sheet copper, seamless brass and copper tube, the reason for this being the continued activity in the manufacture of refrigerating units such as ice cream cabinets and household refrigerators. In addition to the activity in this industry, the building trade still continues to consume huge quantities of seamless brass pipe and sheet copper, and there is at this writing no indication of a slowing down or hesitation in either of these lines.

According to the best authorities it is difficult to see any cloud on the horizon. In spite of the fact that the mills are booked up to capacity with orders there has been no tendency to raise prices or take advantage of the delivery and order-book position, and as a result the margin between the price of raw material and the selling price of fabricated Brass and Copper is lower now than for many years. In other words, although there was an opportunity offered, because of prosperous conditions, for the mills to raise prices, the market has been kept in a stabilized condition because of the competitive situation and also by a desire on the part of all of the manufacturers to keep the price of material at a level where it could be used by everyone.

The nickel and nickel alloy business has been going forward at the same rate as heretofore reported, and there is no indication of a slump in this line. There have been several large contracts let recently for the consumption of Monel metal in kitchen equipment, one of special interest being the Elks' Club in Boston, which is one of the largest kitchen jobs in the East, and a similar installation at the Jesuit Novitiate at Webster, Mass.

There have been many experiments on Monel Metal pickling baskets for nickel plating plants, and a number of recent installations have been made by large manufacturers.

Metal Market Review

Written for The Metal Industry by R. J. HOUSTON, of D. Houston & Company, Inc., Metal Brokers, New York.

COPPER

JULY 1, 1926.

Domestic demand continues to absorb copper freely, as evidenced by the large movement of supplies to consumers. The foreign shipments were also heavy, although recent exports showed a decrease compared with the figures for March and April. Shipments of Copper to American mills and dealers for the first five months of this year amounted to 750,070,000 pounds, or at the rate of 150,014,000 pounds per month. Exports for the same period were 410,376,000 pounds, or at a monthly average of 82,075,200 pounds.

Production of refined copper for the first five months of 1926 amounted to 1,153,020,000 pounds. Total shipments in refined form for domestic use and for export were 1,160,446,000 pounds, or 7,426,000 pounds in excess of output. Surplus stocks of refined copper on June 1 amounted to 138,738,000 pounds, being 6,550,000 pounds less than on May 1. Obviously the technical condition of copper is sufficiently strong to warrant a promising outlook for the market. The Copper Export Trading Co. is expected to become a working concern during the summer or early fall. Lately there has been a rather quiet market at slightly lower prices than were quoted a few weeks ago. The buying movement has been conservative and carefully executed. Market quotes 13⅞@14c for electrotype, market quiet.

ZINC

The market for zinc in June registered a moderate advance in price and a good domestic demand. The activity in buying was specially in evidence during the first half of the month. The price situation was helped by the improvement in foreign quotations. There was an increase in stocks of 3,944 tons during May, but this appeared to be in line with expectations. Stocks in smelters hands on June 1 were 29,934 tons, and compare with 14,300 tons on February 1. The May shipments amounted to 49,759 tons. Production for the month was 53,703 tons, against 53,334 tons for April. Zinc ore is strong at $48 and compares with $45 a few weeks ago. The ore situation is attracting special interest, the aim of producers being apparently to realize even higher prices. Prime Western zinc quotes 7.17½c. St. Louis basis and 7.50c@7.52½c at New York. Market tone is quiet but forward requirements, in many cases, have yet to be covered. A more active domestic market is expected during July as consuming demand continues at a good rate. The total use of zinc for brass making in the United States in 1925 is estimated at 165,000 tons as against 155,000 tons in 1924. This estimate is arrived at after a careful statistical survey by the American Bureau of Metal Statistics.

TIN

During the month of June the tin market was frequently erratic and extremely sensitive. Statistic for May showed an unexpected increase in the visible supply of 2,529 tons. The total visible supply on June 1 amounted to 18,045 tons, and compared with 14,280 tons on April 1. Early in the month values moved downward at both London and New York. The British coal strike caused considerable uncertainty over the trade situation and various conflicting tendencies resulted in making buyers specially cautions for the time being. Spot straits receded to 60¼c on June 1, but shortly afterwards the market became unsettled and declined to 58⅞c with later quotations of 58½c. Futures underwent a corresponding decline.

There has been recovery from the heaviness of a few weeks ago. The market trend became stronger after June 10, with buyers taking a more favorable view of the situation. There was more active buying by dealers, and to a limited extent by consumers in the second half of the month and prices for prompt straits tin advanced to 62⅛c on June 23. There appears to be considerable caution among consumers, however, in covering future requirements. Demand for tin has been restricted at the Welsh tin mills in consequence of the coal strike in England. Operations have increased on the continent, but not enough to offset the curtailed demand in the United Kingdom. American consumption is good. Improvement overseas would soon prove a constructive factor. July Straits tin quotes 60c to 60¾c. Market quiet.

LEAD

The general trade situation in lead showed marked improvement in June. Prices recovered gradually from 7.65c New York basis at the beginning of the month to 8.25c in the second half of June. Higher London quotations followed a better Continental demand, and the foreign betterment gave momentum to domestic buying. The advance brought consumers into the market on a liberal scale for a while, but in view of lower London cables the local market became less active. July and August shipments were well absorbed, however, on the recent buying movement, and producers are in position to maintain a firm attitude. Production for May was reported at 69,538 tons of crude as compared with 65,471 tons in April, and of refined 68,237 tons as against 63,603 tons in April. Stocks at end of May were 19,935 tons, against 14,144 tons at end of April.

ALUMINUM

Continued consumption at a high rate and the remarkable steadiness of the market are outstanding features which emphasize the strong position of this metal. Prices hold up without variation at the former level of 28c for Virgin ingot aluminum of 99% plus and 27c for 98-99% grade. There was some curtailment in domestic demand reported lately, but heavy requirements are expected for the second half of the year. Production and imports have been large, but the additional supplies appear to be well taken care of. Large requirements are expected from the auto makers. Buying recently, however, was on a conservative scale owing to some uncertainty as regards the future. The arrivals of foreign material for the first four months of this year amounted to 27,853,372 pounds against 7,909,811 pounds in the same period of 1925. German aluminum has figured in a prominent way in the imports this year.

ANTIMONY

A definite upward trend was developed lately. Sales were made at successively advancing prices during June. Buyers showed avidity in taking up offerings as the market gave strong inclinations of rallying from the acute depression prevailing in May. The sharp comeback was equal to an advance of between 3 and 4 cents a pound, at one time. Recent business was done at 10½c c.i.f. New York for future shipment from China. An easier tone has developed since, with July-August shipment offered at 10c@10¼c c.i.f. New York. Spot price per 25-ton lots is quoted at 13¼c duty paid. Later deliveries are quoted at 13 cents for Chinese regulus of 99% fine. Interest was less keen at the month end, but holders of considerable stocks, bought at higher levels, prefer to wait for more favorable conditions before liquidating their holdings.

QUICKSILVER

There has been no specially large inquiry lately. Spot demand was reported inactive and market slightly easier. Prices quoted are $91@$91.50 for 75 lb. flasks. Italy was below London lately and New York fully as reasonable as the Italian article. Active inquiry, however, could reverse the situation.

PLATINUM

Refined platinum quotes $109 per ounce. Shipments of crude platinum were expected from South Africa, but doubts are expressed regarding supplies from that country. Prices are therefore firmer.

SILVER

Refined platinum quotes $109 per ounce. Shipments of crude give special stimulus to the market. China and India displayed interest and were more or less active on occasions, but present quotations of 65⅜c compare with the 1925 average of 69.065c. A sharp advance a few weeks ago sent the price to 66¼c an ounce. This rise was attributed to the refusal of the United States Senate to repeal the Pittmann Act which calls for purchases by the Government of 14,500,000 ounces of domestic silver at $1 an ounce. The effect of this action, however, was regarded as largely sentimental and made a speculative ripple for a short time. Production of silver in countries of the world which produced 89 per pent of the total world's output for the first five months of this year was 89,672,000 fine ounces, or a monthly average of 17,934,000 ounces, as compared with 17,588,000 for the full year of 1925.

OLD METALS

The retent movement of scrap material from dealers to consumers was on a fairly good scale. Disposal of heavy copper and wire in round tonnages was reported, and prices paid were considered at satisfactory ratio to new metal. There were sales of composition and brass turnings in fair quantities for export, but subsequent inquiries from foreign sources were based on lower quotations. The lead scraps held up well due to firmer conditions in the market for pig lead. A good demand and firm prices for lead scrap prevailed in the Middle West. Urgent buying, however, subsided somewhat on attempts to raise quotations. Consumers were not inclined on upward scale of prices. Demand was rather quiet at close of month, but more activity is looked for after the Fourth. Current prices quoted are 11½c@11¾c for heavy copper, 9½c@9¾c for light copper, 7¼c@7½c for heavy brass, 9¼c@9½c for new brass clippings, 6¼c@6½c for light brass, 6½c@7c for heavy lead, 4c@4¼c for old zinc, and 21c@21½c for aluminum clippings.

WATERBURY AVERAGE

Lake Copper—Average for 1925, 14.427—January, 1926, 14.25c.—February, 14⅜c.—March, 14.25c.—April, 14.125c.—May, 14.00c.—June, 14.00c.

Brass Mill Zinc—Average for 1925, 8.263—January, 1926, 9.00c.—February, 8.20c.—March, 7.80c.—April, 7.45c.—May, 7.20c.—June, 7.55c.

Daily Metal Prices for the Month of June, 1926

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1	2	3	4	7	8	9	10	11	14	15	16	17
Copper (f. o. b. Ref.) c/lb. Duty Free													
Lake (Delivered)	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.125	14.125	14.125	14.125
Electrolytic	13.70	13.70	13.70	13.70	13.70	13.70	13.75	13.85	13.85	13.90	13.90	13.90	13.90
Casting	13.35	13.35	13.30	13.30	13.30	13.35	13.45	13.45	13.45	13.50	13.50	13.50	13.50
Zinc (f. o. b. St. L.) c/lb. Duty 1¼c/lb.													
Prime Western	6.95	7.00	7.00	7.00	7.05	7.05	7.10	7.125	7.175	7.25	7.225	7.20	7.15
Brass Special	7.025	7.025	7.075	7.075	7.10	7.15	7.175	7.20	7.25	7.325	7.30	7.275	7.225
Tin (f. o. b., N. Y.) c/lb. Duty Free													
Straits	60.25	59.75	59.50	58.875	58.50	58.75	59.375	59.25	60.25	61.25	61.125	61.125	61.75
Pig 99%	58.00	57.25	57.25	56.75	56.85	57.125	57.50	57.50	58.50	59.00	58.875	58.875	59.50
Lead (f. o. b. St. L.) c/lb. Duty 2¼c/lb.	7.50	7.50	7.55	7.55	7.55	7.55	7.60	7.65	7.90	8.00	8.15	8.25	8.30
Aluminum c/lb. Duty 5c/lb.	28	28	28	28	28	28	28	28	28	28	28	28	28
Nickel c/lb. Duty 3c/lb.													
Ingot	35	35	35	35	35	35	35	35	35	35	35	35	35
Shot	36	36	36	36	36	36	36	36	36	36	36	36	36
Electrolytic	39	39	39	39	39	39	39	39	39	39	39	39	39
Antimony (J. & Ch.) c/lb. Duty 2c/lb.	10.75	10.25	10.50	10.75	11.50	11.00	10.00	10.25	10.00	10.25	10.50	11.50	11.50
Silver c/oz. Troy Duty Free	65.00	65.125	65.125	65.125	65.25	65.25	65.25	65.625	65.625	65.625	65.50	65.875	66.25
Platinum $/oz. Troy Duty Free	105	105	105	105	105	105	105	105	105	105	107	107	107

	18	21	22	23	24	25	28	29	30	High	Low	Aver.
Copper (f. o. b. Ref.) c/lb. Duty Free												
Lake (Delivered)	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.125	14.00	14.023
Electrolytic	13.85	13.85	13.85	13.85	13.75	13.75	13.75	13.75	13.75	13.90	13.70	13.791
Casting	13.45	13.45	13.45	13.45	13.40	13.40	13.40	13.40	13.40	13.50	13.30	13.414
Zinc (f. o. b. St. L.) c/lb. Duty 1¼c/lb.												
Prime Western	7.125	7.125	7.125	7.20	7.225	7.20	7.175	7.20	7.20	7.25	6.95	7.130
Brass Special	7.225	7.225	7.225	7.275	7.30	7.275	7.25	7.275	7.275	7.325	7.025	7.206
Tin (f. o. b., N. Y.) c/lb. Duty Free												
Straits	61.50	61.25	61.375	62.125	61.50	61.875	61.375	61.75	61.25	62.125	58.50	60.625
Pig 99%	59.00	58.75	58.875	59.50	59.25	59.375	59.00	59.25	59.00	59.50	56.75	58.408
Lead (f. o. b. St. L.) c/lb. Duty 2¼c/lb.	8.20	8.15	8.10	8.15	8.15	8.10	8.10	8.10	8.10	8.30	7.50	7.918
Aluminum c/lb. Duty 5c/lb.	28	28	28	28	28	28	28	28	28	28	28	28
Nickel c/lb. Duty 3c/lb.												
Ingot	35	35	35	35	35	35	35	35	35	35	35	35
Shot	36	36	36	36	36	36	36	36	36	36	36	36
Electrolytic	39	39	39	39	39	39	39	39	39	39	39	39
Antimony (J. & Ch.) c/lb. Duty 2c/lb.	11.50	12.00	12.50	13.50	14.00	13.75	13.25	13.50	13.50	14.00	10.00	11.648
Silver c/oz. Troy Duty Free	65.875	65.75	65.625	65.375	65.50	65.375	65.375	65.75	65.75	66.25	65.00	65.50
Platinum $/oz. Troy Duty Free	107	107	107	107	107	109	109	109	110	110	105	106.50

Metal Prices, July 6, 1926

NEW METALS

Copper: Lake, 14.00. Electrolytic, 13.85. Casting, 13.45.
Zinc: Prime Western, 7.25. Brass Special, 7.35.
Tin: Straits, 62.375. Pig, 99%, 60.125.
Lead: 8.10. **Aluminum,** 28.00. **Antimony,** 13.75.
Nickel: Ingot, 35. Shot, 36. Elec., 39. Pellets, 40.
Quicksilver, flask, 75 lbs., $91.50. **Bismuth,** $2.70 to $2.75.
Cadmium, 60. **Cobalt,** 97%, $2.60. **Silver,** oz., Troy, 65.375.
Gold, oz., Troy, $20.67. **Platinum,** oz., Troy, $110.00.

INGOT METALS AND ALLOYS

Brass Ingots, Yellow	10¼ to 11
Brass Ingots, Red	11¾to12¾
Bronze Ingots	11¾to12¾
Casting Aluminum Alloys	21 to24
Manganese Bronze Castings	23 to41
Manganese Bronze Ingots	13 to17
Manganese Bronze Forging	34 to42
Manganese Copper, 30%	25 to35
Monel Metal Shot	32
Monel Metal Blocks	32
Parsons Manganese Bronze Ingots	18¼to19¾
Phosphor Bronze	13½to15
Phosphor Copper, guaranteed 15%	18⅞to22½
Phosphor Copper, guaranteed 10%	18 to21½
Phosphor Tin, guaranteed 5%	70 to80
Phosphor Tin, no guarantee	67 to77
Silicon Copper, 10% ....according to quantity...	25 to35

OLD METALS

Buying Prices		Selling Prices
11½to11¾	Heavy Cut Copper	13 to13⅛
11¼to11½	Copper Wire	12¾to13
9¾to10	Light Copper	10¾to11¼
9 to 9¼	Heavy Machine Composition	10½to10¾
7¾to 8	Heavy Brass	9 to 9¼
6¾to 7	Light Brass	8 to 8¼
7¾to 8¼	No. 1 Yellow Brass Turnings	9½to10
8¾to 9¼	No. 1 Composition Turnings	10½to11
7¼to 7½	Heavy Lead	8 to 8¼
5 to 5¼	Zinc Scrap	6 to 6⅛
12 to13	Scrap Aluminum Turnings	15 to17
19 to20	Scrap Aluminum, cast alloyed	21 to22
22½to23	Scrap Aluminum, sheet (new)	24 to25½
38 to40	No. 1 Pewter	42 to44
12	Old Nickel Anodes	14
18	Old Nickel	20

Wrought Metals and Alloys

COPPER SHEET

Mill shipments (hot rolled)..... 21½c. to 22½c. net base
From stock ..... 22½c. to 23½c. net base

BARE COPPER WIRE

16¼c. to 16⅜c. net base. In carload lots.

COPPER SEAMLESS TUBING

24¼c. to 25¼c. net base.

SOLDERING COPPERS

300 lbs. and over in one order..... 21 c. net base
100 lbs. to 200 lbs. in one order..... 21½c. net base

ZINC SHEET

Duty, sheet, 15% Cents per lb.
Carload lots, standard sizes and gauges, at mill, less
8 per cent discount ..... 11.25 net base
Casks, jobbers' price ..... 12.50 net base
Open Cacks, jobbers' price ..... 13.00 to 13.25 net base

ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga., base price..... 40c.
Aluminum coils, 24 ga., base price.....36.70c.
Foreign ..... 40c.

ROLLED NICKEL SHEET AND ROD

Net Base Prices

Cold Drawn Rods.....	58c.	Cold Rolled Sheet.....	60c.
Hot Rolled Rods.....	50c.	Hot Rolled Sheet.....	52c.

BLOCK TIN SHEET

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more, 10c or over Pig Tin; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 17c. over; less than 25 lbs., 25c. over.

SILVER SHEET

Rolled sterling silver, 65¾ to 67¾c.

BRASS MATERIAL—MILL SHIPMENTS

In effect March 26, 1926
To customers who buy 5,000 lbs. or more in one order.

	Net base per lb.		
	High Brass	Low Brass	Bronze
Sheet	$0.18⅞	$0.20⅜	$0.22⅜
Wire	.19⅜	.20⅞	.22⅞
Rod	.16⅝	.21⅛	.23⅛
Brazed tubing	.26⅞	.....	.32⅛
Open seam tubing	.26⅞	.....	.32⅛
Angles and channels	.29⅞	.....	.35⅛

For less than 5,000 lbs. add 1c. per lb. to above prices.

BRASS SEAMLESS TUBING

23½c. to 24½c. net base.

TOBIN BRONZE AND MUNTZ METAL

Tobin Bronze Rod ..... 20⅞c. net base
Muntz or Yellow Metal Sheathing (14"x48") 18⅞c. net base
Muntz or Yellow Rectangular sheet other Sheathing ..... 19⅞c. net base
Muntz or Yellow Metal Rod ..... 16⅞c. net base
Above are for 100 lbs. or more in one order.

NICKEL SILVER (NICKELENE)

Net Base Prices

Grade "A" Sheet Metal			Wire and Rod		
10%	Quality	26¾c.	10%	Quality	29¾c.
15%	"	28¼c.	15%	"	33½c.
18%	"	29½c.	18%	"	36¾c.

MONEL METAL SHEET AND ROD

Hot Rolled Rods (base)	35	Hot Rolled Sheets (base)	42
Cold Drawn Rods (base)	43	Cold Rolled Sheets (base)	50

BRITANNIA METAL SHEET

No. 1 Britannia—18" wide or less, No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 8c. over N. Y. tin price; 100 lbs. to 500 lbs., 10c. over; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over. Prices f. o. b. mill.

Supply Prices, July 6, 1926

ANODES

Copper: Cast	21½c. per lb.	**Nickel:** 90-92%	45c. per lb.
Rolled	21⅛c. per lb.	95-97%	47c. per lb.
Electrolytic	18⅝c. per lb.	99%	49c. per lb.
Brass: Cast	20½c. per lb.	**Silver:** Rolled silver anodes .999 fine are quoted from 68½c. to 70½c. per Troy ounce, depending upon quantity purchased.	
Rolled	21⅛c. per lb.		
Zinc: Cast	13⅝c. per lb.		

FELT POLISHING WHEELS WHITE SPANISH

Diameter	Thickness	Under 100 lbs.	100 to 200 lbs.	Over 200 lbs.
10-12-14 & 16"	1" to 3"	$3.00/lb.	$2.75/lb.	$2.65/lb.
6-8 & over 16	1 to 3	3.10	2.88	2.75
6 to 24	Under ½	4.25	4.00	3.90
6 to 24	½ to 1	4.00	3.75	3.65
6 to 24	Over 3	3.40	3.15	3.05
4 up to 6	¼ to 3	4.85	4.85	4.85
4 up to 6	Over 3	5.25	5.25	5.25
Under 4	¼ to 3	5.45	5.45	5.45
Under 4	Over 3	5.85	5.85	5.85

Grey Mexican Wheel deduct 10c per lb. from White Spanish prices.

COTTON BUFFS

Full Disc Open buffs, per 100 sections.

12" 20 ply 64/68 Unbleached	$31.70–33.10
14" 20 ply 64/68 Unbleached	40.80–41.15
12" 20 ply 80/92 Unbleached	33.65
14" 20 ply 80/92 Unbleached	45.60
12" 20 ply 84/92 Unbleached	38.35–42.85
14" 20 ply 84/92 Unbleached	52.00–57.40
12" 20 ply 80/84 Unbleached	37.75–38.90
14" 20 ply 80/84 Unbleached	51.20–52.40

Sewed Pieced Buffs, per lb., bleached 65-75c.

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.12–.16
Acid—Boric (Boracic) Crystals	lb.	.12
Hydrochloric (Muriatic) Tech., 20°, Carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30%, bbls	lb.	.08
Nitric, 36 deg., carboys	lb.	.06
Nitric, 42 deg., carboys	lb.	.07
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	.17¾–.22¼
Denatured in bbls	gal.	.33
Alum—Lump, Barrels	lb.	.03¼
Powdered, Barrels	lb.	.042
Aluminum sulphate, commercial tech	lb.	.02⅜
Aluminum chloride solution in carboys	lb.	.06½
Ammonium—Sulphate, tech. bbls	lb.	.03¾
Sulphocyanide	lb.	.65
Arsenic, white, kegs	lb.	.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.60
Borax Crystals (Sodium Biborate), bbls	lb.	.05½
Calcium Carbonate (Precipitated Chalk)	lb.	.04
Carbon Bisulphide, Drums	lb.	.06
Chrome Green, bbls	lb.	.30
Copper—Acetate (Verdegris)	lb.	.37
Carbonate, bbls	lb.	.17
Cyanide (100 lb. kegs)	lb.	.50
Sulphate, bbls	lb.	.05
Cream of Tartar Crystals (Potassium bitartrate)	lb.	.27
Crocus	lb.	.15
Dextrin	lb.	.05–.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluor-spar (Calcic fluoride)	ton	$75.00
Fusel Oil	gal.	$4.45
Gold Chloride	oz.	$14.00
Gum—Sandarac	lb.	.26
Shellac	lb.	.59–.61
Iron, Sulphate (Copperas), bbl	lb.	.01½
Lead Acetate (Sugar of Lead)	lb.	.13
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.15
Nickel—Carbonate dry, bbls	lb.	.29
Chloride, bbls.	lb.	.19–.21
Salts, single 300 lb. bbls	lb.	.10½
Salts, double 425 lb. bbls	lb.	.10
Paraffin	lb.	.05–.06
Phosphorus—Duty free, according to quantity		.35–.40
Potash, Caustic Electrolytic 88-92% fused drums	lb.	.09¼
Potassium Bichromate, casks (crystals)	lb.	.08½
Carbonate, 96-98%	lb.	.07
Cyanide, 165 lb. cases, 94-96%	lb.	.57½
Pumice, ground, bbls	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge, nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in casks	lb.	.08
Silver Chloride, dry	oz.	.86
Cyanide (Fluctuating Price)	oz.	.66
Nitrate, 100 ounce lots	oz.	.45¾
Soda Ash, 58%, bbls	lb.	.02½
Sodium—Cyanide, 96 to 98%, 100 lbs	lb.	.20
Hyposulphite, kegs	lb.	.04
Nitrate, tech., bbls	lb.	.04¾
Phosphate, tech., bbls	lb.	.03¾
Silicate (Water Glass), bbls	lb.	.02
Sulpho Cyanide	lb.	.45
Sulphur (Brimstone), bbls	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.42½
Tripoli, Powdered	lb.	.03
Wax—Bees, white ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½–.06
Zinc, Carbonate, bbls	lb.	.11
Chloride, casks	lb.	.07⅜
Cyanide (100 lb. kegs)	lb.	.41
Sulphate, bbls.	lb.	.03⅛